MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

CULTURAL RESOURCES INVESTIGATION NORTH OF THE EL CERRITO BRIDGE AND DATA RECOVERY PLAN FOR LA 84318, A MULTICOMPONENT ARTIFACT SCATTER AT EL CERRITO, SAN MIGUEL COUNTY, NEW MEXICO

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ADMINISTRATIVE SUMMARY

In April 1991, the Office of Archaeological Studies conducted a cultural resources inventory [redacted] along [redacted] in San Miguel County, New Mexico. One archaeological site, LA 84318, was identified. LA 84318 was further evaluated through a limited testing program. This site is a multicomponent prehistoric and historic period artifact scatter. As a result of the limited testing program, artifacts were field recorded and recovered from surface and subsurface deposits. Upper soil levels exhibited a mix of historic and prehistoric materials suggesting post-occupational mixing of the deposits. The lower soil levels yielded only prehistoric materials suggesting greater potential for contextual integrity. Aboriginal ceramics and Euro-American artifacts from the upper levels date to the nineteenth and twentieth centuries. No diagnostic materials were recovered from the lower levels, but regional culture history indicates that the material could date from the Early Archaic period (5000 B.C.) to A.D. 1700.

LA 84318 has the potential to yield important information about persistence and change in local and regional economic organization. The depth and extent of the cultural deposit suggest that the site had a long and discontinuous occupation by hunting and gathering groups that inhabited the Pecos River. The site depth and potential for minimally disturbed deposits may make it possible to address problems of persistence and change in relationships between hunter-gatherer technological behaviors and their economic systems.

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INTRODUCTION

In April 1991, at the request of the New Mexico State Highway and Transportation Department (NMSHTD), the Office of Archaeological Studies, Museum of New Mexico, conducted a cultural resources inventory north of the [redacted] [redacted] San Miguel County, New Mexico. The inventory was for a curve realignment, which included existing and new rights-of-way. During the inventory, a portion of an archaeological site, LA 84318, was identified within the right-of-way. The inventory was conducted by Stephen Post. A limited testing program that included recording and testing was conducted by Stephen Post, Timothy Maxwell, Vernon Lujan, and Timothy Martinez. David A. Phillips, Jr. served as the principal investigator. The results of the survey and limited testing program, recommendations, and a data recovery plan are presented in this report. The legal description for LA 84318 is presented in Appendix 1. Project location is shown in Figure 1.

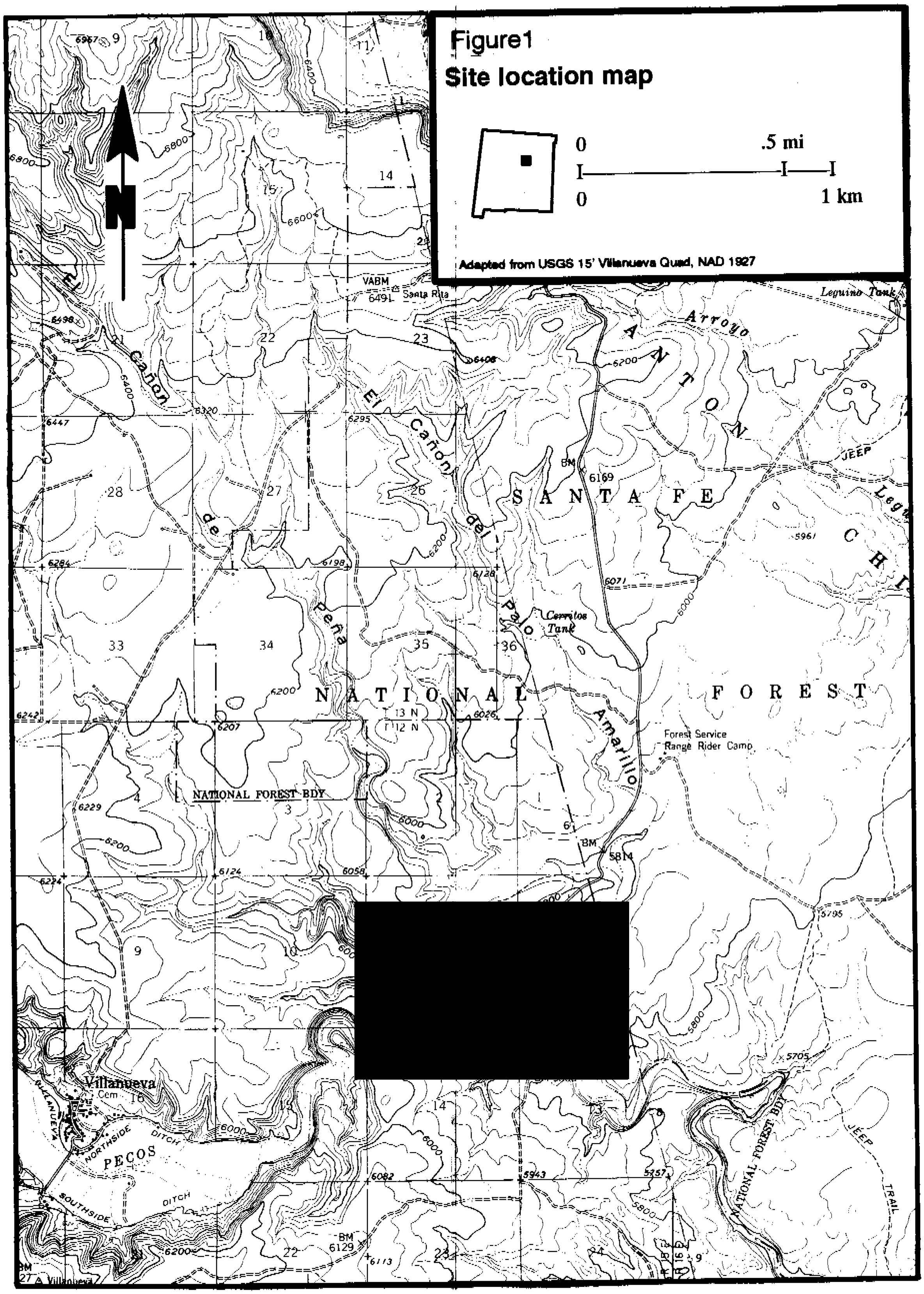

Figure1
Site location map

ENVIRONMENT

The project area in southwest San Miguel County is a transition zone between the Southern Rocky Mountain Province and the Pecos Valley section of the Great Plains Province. The immediate area is dominated by the Pecos River canyon and the surrounding mesas and broken lands (Maker et al. 1972:6).

The southwest San Miguel topography is described as "a relatively large upland area characterized by rolling hills and gently to strongly sloping mesa tops. The mesa area which grades indistinctly to the east into the Pecos Valley section of the Great Plains Province, is moderately dissected and locally entrenched by steep canyons" (Maker et al. 1972:6). The immediate project area fits the characterization of "locally entrenched by steep canyons." The Pecos River Canyon floor is at an elevation of 1,738 m (5,700 ft). The canyon rim, 63 m above the canyon floor, is 1,798 m (5,900 ft) in elevation. The canyon walls range from almost vertical to gentle just above the floodplain. At El Cerrito, the Pecos River is very sinuous, creating irregular sized patches of bottom land.

The soils in the project area consist of Tuloso-Sombordoro rock outcrops and Manzano clay loam. The first predominates on slopes and escarpments and mesas, ridges, and uplands and is formed in material weathered from sandstone, limestone, and shale. The second is the deep, well-drained soils of the Pecos River floodplain (Hilley et al. 1981).

The upland soils of the Tuloso-Sombordoro rock outcrops support a potential plant community of piñon, juniper, blue grama, hairy grama, and sideoats grama. Its modern agricultural potential is rated as low. Agricultural potential using prehistoric dry farming techniques is unknown (Hilley et al. 1981:37).

The floodplain plant community consists of western wheatgrass, blue grama, and alkali sacaton. The agricultural rating of these soils is good. Alfalfa, small grains, vegetables, and orchard fruits are the most common modern crops. Some corn, legumes, and sorghum are also grown. Rooting depth is 60 inches with better than average soil permeability (Hilley et al. 1981:25).

Precipitation records for the project area come from Villanueva and cover 33 to 36 years (Gabin and Esperance 1977:316). The mean annual precipitation ranges between 12.8 and 13.1 inches. As is typical of the arid American Southwest, summer thunderstorms account for more than 50 percent of the annual precipitation. Brief flooding in July, August, and September may occur.

Temperature data for the project area are unavailable. Ribera station in San Miguel County, which is 12 miles to the west and 1,000 ft higher in elevation, recorded an average temperature of 51.1 to 51.6 degrees F for a 3-year period. The temperature for El Cerrito can be extrapolated from the Ribera data using the elevation norm of 5 degrees for every 1,000 ft in elevation (Tuan et al. 1973:65) to yield a mean temperature of about 56 degrees F.

In terms of climatic suitability for prehistoric agriculture, length of the growing season is more important than the mean temperature. Again no data are available from El Cerrito. An isopleth map of average growing season length in Tuan et al. (1973:87) indicates a range of 140 to 160 days. The last killing frost occurs most commonly at the end of April and the first killing frost in the fall in the middle of October (Tuan et al. 1973:88-89).

CULTURE HISTORY

The culture history of the El Cerrito area spans the prehistoric and historic periods within regional and local contexts. The regional prehistory is a compilation of data from highway salvage and dam projects completed in the last 30 years. The local prehistory is derived from archaeological survey of Santa Fe National Forest, Bureau of Land Management, state, and private lands close to El Cerrito and Villanueva. The historic occupation of El Cerrito prior to the twentieth century has not been clearly documented in the literature to date.

Regional Prehistory

The regional prehistory includes the complete chronological sequence for northeastern New Mexico. Northeastern New Mexico is defined in Stuart and Gauthier (1981:293, map VII.1) as the area included between San Jon and the Texas border, south to Vaughn and north to the Colorado border along the eastern crest of the Sangre de Cristo Mountains. The chronological sequences are derived from Wendorf (1960) and Thoms (1976) for northeastern New Mexico; Levine and Mobley (1976) for Los Esteros along the Pecos River, near Santa Rosa; Hammack (1965) for the Ute Dam Reservoir at the confluence of the Canadian River and Ute Creek, near Logan; Lang (1978) for the Conchas Dam Reservoir at the confluence of the Conchas and Canadian rivers, near Variadero, New Mexico; and Glassow (1980) for the area near Cimarron, New Mexico on the eastern slope of the Sangre de Cristo mountains. The reservoir projects represent long, but discontinuous periods of occupation and use of riverine and mesa top environments. Glassow's study of the Cimarron area provides an occupational sequence for a lower montane environment. Table 1, taken from Stuart and Gauthier (1981:292), shows the regional chronological sequence.

As indicated by Stuart and Gauthier (1981:295), the occupation sequence for northeast New Mexico is very disjointed and incomplete. The picture is clouded by a paucity of absolute dates and by a lack of spatial continuity between the studied areas. This spatial discontinuity has led to largely unsatisfying attempts to define cultural boundaries and affiliations. One researcher's Archaic period manifestation is another researcher's protohistoric manifestation (Mobley 1979; Hammack 1965). Typically, for the period A.D. 1000 to 1500, researchers have tried, largely unsuccessfully, to determine if at different times northeastern New Mexico prehistoric populations were more similar to Plains Panhandle cultures or a far eastern derivation of the Rio Grande Anasazi. These problems will remain until there is an increase in systematic excavation and detailed survey recording of the archaeological sites.

The local prehistory has never been synthesized. Because most of the land in the area is private, few large-scale surveys have been conducted and completed surveys are management rather than research oriented. Some research surveys of the surrounding area near Romeroville, Bernal, and San Miguel del Vado have been done, but only minimally reported. Parcels of Santa Fe National Forest land near the village of El Cerrito have been surveyed. The following discussion is derived from the Archaeological Records Management System files (ARMS) and Santa Fe National Forest, Las Vegas ranger district reports from about 3,500 acres of survey area (Smith 1979; Abel 1987, 1989a, 1989b, 1990).

Table 1. Chronological Sequences for Northeastern New Mexico (after Stuart and Gauthier 1981:292)

Date	Wendorf (1960) NE New Mexico	Thoms (1976) NE New Mexico	Levine and Mobley (1976) Los Esteros	Hammack (1965) Ute Dam	Land (1978) Conchas Res.	Glassow (1980) Cimarron Area
A.D. 1800	Historic Nomads	Apaches	Plains Period	Plains Nomads	Plains Nomads	Jicarilla 1750-1900
1700						
1600						Cojo 1550-1750
1500	Hiatus?			Panhandle	Plains Village	Hiatus ?
1400	Panhandle	Panhandle	Pueblo			
1300	Pueblo			Pueblo		Cimarron 1200-1300 Ponil 1100-1250
1000		Pueblo	Archaic	Archaic	Plains Woodland	Escritores 900-100 Pedregoso 700-900 Vermejo 400-700
A.D. 200	Archaic	Archaic			Archaic	Archaic
1000						
2000						
3000						
5000	Plano	Paleoindian	Paleoindian	Paleoindian	Paleoindian	
7000	Folsom					Folsom?
10,000						
11,000	Clovis					

Table 2 presents site type frequencies by period for nine 7.5' USGS quads surrounding El Cerrito. Artifact scatter refers to sites with sherds and lithic artifacts. Fieldhouse usually refers to a one- to three-room structure with a small amount of associated refuse. Residential sites have more than three rooms, some have kivas, and most have extensive trash deposits. Stone enclosure refers to one- or two-room cobble or slab collapsed structures that are similar to Panhandle focus structures or Pueblo period fieldhouses. They are not termed Panhandle focus because that is an untested assumption about the cultural affiliation of these site types. They are not called fieldhouses because of the very low number or absence of ceramics observed. Jicarilla sites include both structures and artifact scatters, but the number of structures is usually not reported. The sites are noted to emphasize that there was a Jicarilla occupation of the area. Most of the historic sites included residences, sheepherding camps, wells, and isolated structures.

Table 2. Site types by Period for Nine Quads Surrounding El Cerrito*

Site Type Period	Lithic Scatter	Artifact Scatter	Fieldhouse	Residential	Stone Enclosure	Other
Archaic	2/2.0					
Early Archaic	1/1.0					
Late Archaic	4/3.0					
Pueblo 700-900						
Pueblo 900-1100		1/1.0		1/1.0		
Pueblo 900-1300		4/3.0		4/3.0		
Pueblo 1100-1300		3/2.0		9/7.0		
Pueblo 1100-1600		2/2.0	1/1.0			
Pueblo 1300-1600		4/3.0	2/2.0			1/1.0
Jicarilla 1500-1860?		6/5.0				
Historic						5/4.0
Pre-1900						12/9.0
Post 1900						4/3.0
Unknown	50/39.0				1/9.02	1/1.0
Total (n=129)	57/44.0	20/16.0	3/2.0	14/11.0	12/9.0	23/18.0

* Included USGS quads: San Juan, Villanueva, Tecolote, Aurora, Laguna Ortiz, Leyba, Rencona, Sena, San Jose

Paleoindian Period

The Paleoindian period in northeastern New Mexico dates between 11,000 and 5000 B.C. Paleoindian artifacts include the whole range of Southern Plains diagnostic spear points and even a few examples of Northern Plains material. Paleoindian settlement and subsistence have been portrayed as dependent on the migratory behavior of large mammals of the late Pleistocene and early Altithermal periods. Typical Paleoindian manifestations are isolated spear points and kill and butchering sites. This bias towards meat procurement undoubtedly reflects only one facet of the Paleoindian diet (Stuart and Gauthier 1981:300). A broader subsistence base is more likely because large-game herds were probably only seasonally available and because Paleoindian populations could not have survived solely on an all-meat diet (Stuart and Gauthier 1981:300). This heavy bias in the literature illustrates how little we know about Paleoindian subsistence.

Stuart and Gauthier (1981:295) reviewed the spatial distribution of Paleoindian sites for northeastern New Mexico and suggested two settlement patterns that may have resulted from the movement of two bands. One band is represented by the occurrence of Clovis, Folsom, Plainview, and Cody period remains along the foothills of the eastern Sangre de Cristo Mountains. This pattern may reflect a higher elevation or partly montane adaptation. The other band may be represented by remains from the above periods and San Jon, Milnesand, and Meserve projectile points. These latter types are restricted in their occurrence to the lower elevations along the Canadian Escarpment. Stuart and Gauthier (1981:295) readily admit that these patterns are very tenuous, but they do suggest a variability in the Paleoindian settlement patterns.

No Paleoindian sites have been reported for the El Cerrito area. More than likely, Paleoindian sites exist outside the survey areas covered to date.

Archaic Period

The Archaic period is very poorly represented in northeastern New Mexico. Most chronologies assign sites dating to 5000 B.C. to the Early Archaic period. The Late Archaic period spans from 5000 B.C. to A.D. 200-1000. depending on the study area (Campbell 1969; Lang 1978; Thoms 1976; Glassow 1980). So little is known about the Archaic period in northeastern New Mexico that Gunnerson's (1987) overview of High Plains archaeology, which included northeastern New Mexico as far as Las Vegas, made no reference to sites in the area.

Unlike the Oshara tradition area to the west, Cochise tradition to the southwest, and the Archaic traditions of the High Plains, there is no sequential division of the Early Archaic period nor are there settlement and subsistence data. A temporal overlap between late Paleoindian and Early Archaic occupations in northeastern New Mexico is suggested by the excavation from Pigeon Cliffs, near Clayton (Steen 1955). This overlap may represent an early change to a general hunting and gathering strategy by canyon-based Archaic groups, while the eastern plains continued to support the large mammals that supported the Paleoindian hunting adaptation (Campbell 1976:86). Other Early Archaic sites have been found near Mineral Hill, New Mexico, south of Las Vegas. These sites are associated with a lithic raw material quarry (Warren n.d.). A small number of Early Archaic period sites were recorded at Ute Dam (Hammack 1965) and Los Esteros, the Levine and Mobley (1976) excavations.

The Late Archaic period is roughly dated between 500 B.C. and 1000 A.D. except for the Conchas Dam area (Lang 1978) and the Cimarron area (Glassow 1980). The Late Archaic period is a continuation of the smaller animal hunting and gathering subsistence pattern initiated during the Altithermal. This pattern was probably based on the seasonal availability of plant and animal resources.

At Los Esteros, a centrally based but wandering settlement and subsistence strategy was proposed for the Archaic period (Levine and Mobley 1976:69). This pattern is somewhat analogous to Binford's foraging pattern (1983a). In this pattern, residential locations were placed near critical resources within a daily foraging radius of seasonally abundant plant and animal resources. Low periods of availability would have been ameliorated by storage facilities in Levine and Mobley's interpretation (1976:69). Binford's model suggests that foragers would move to another location when an existing resource base was exhausted or depleted (1983a:339-344). Levine and Mobley also suggest that the hunter-gatherer adaptation of the Archaic period extended until A.D. 1000 or possibly later. In other words, hunting and gathering, rather than a cultural adaptation, was a viable strategy that was applied to the Pecos River environs as long as practical (Levine and Mobley 1976:68).

For all researchers, the end of the Archaic period was signified by an increased reliance on agricultural products, the construction of masonry structures or pithouses, the introduction of pottery, and use of the bow and arrow. The Cimarron area exhibited the earliest change to a more sedentary and agricultural pattern, while the Los Esteros, Conchas, and Ute Dam areas show very limited change. The larger population concentration that is evident in Texas, to the south along the Rio Pecos (Jelinek 1967), and from the Rio Grande west, has only been documented for the Cimarron area (Glassow 1980).

The Archaic period for the El Cerrito area is represented by six sites, one of which has an early and a late component. Site dates are based on projectile point styles similar to the Oshara tradition (Irwin-Williams 1973). The sites range in size from 500 to over 10,000 sq m. One of the sites includes a lithic raw material quarry, that was probably used after the Archaic occupation, resulting in an inflated size estimate. Hill or mesa top and river bench locations were the most favored. Site content includes quarry, core reduction, and tool production debris, complete and broken bifaces, utilized flakes, and manos. In one case more than eight hearths were observed. Many of the temporally nondiagnostic lithic artifact scatters probably have Archaic components, just as the larger Archaic period sites probably have later components mixed in. More sites need to be identified and stronger temporal control established before the Archaic period can be effectively studied in this area.

The Pueblo Period

The Pueblo period is better understood than the Archaic period, but has problems caused by superimposing other regional cultural historical frameworks over the northeastern New Mexico settlement patterns. The Pueblo period begins between A.D. 400 and 1000 depending on the area and continues into the early 1300s, when it was replaced by the Plains Panhandle aspect or a rejuvenation of the hunting and gathering adaptation exemplified by the arrival of the Athabaskan populations from the north.

The Pueblo period occupation of northeastern New Mexico, and especially the southwestern quarter of that section, is not well documented. Occupations that would be termed Basketmaker III or Pueblo I under the Pecos Classification or Early to Middle Developmental under the Northern Rio Grande classification (Wendorf and Reed 1955) are unknown. Low areal survey coverage could account for the absence of sites for this period as much as an actual lack of settlement. A persistent hunting and gathering adaptation is suggested for the Los Esteros area (Mobley 1979). Lang (1978) indicates that in the Conchas area a Pueblo-type occupation was never established and that cultural historical developments followed a track more similar to a Plains Woodland trajectory.

A change to a more sedentary and agricultural pattern is documented for the Cimarron area (Glassow 1980). The period between A.D. 400 and 1100 is divided into three phases: Vermejo phase (A.D. 400-700), Pedregoso phase (A.D. 700-900), and Escritores phase (A.D. 900-1100). This period is characterized by changes in architecture from single-room slab structures to shallow pithouses. Pottery, while never abundant, is similar to wares produced or available in the Santa Fe and Taos areas. Settlement locations moved from upper elevation mesa tops and canyon heads to canyon mouths and adjacent to floodplain locations. Subsistence changed from an equal focus on wild and gathered foods in combination with agricultural products to a greater reliance on cultivated products.

In the El Cerrito area, the Early Developmental period (A.D. 500-900) is not represented in the surveyed sample. Very little evidence of early Developmental period occupation has been reported for the Santa Fe area (Cordell 1979) and is missing from most inventories for northeastern New Mexico, with the exception of the Cimarron District (Glassow 1980). One hypothesis is that a hunting and gathering pattern persisted into the A.D. 900s (Cordell 1979:32-33). The riverine environments are cited for their diversity, which would have precluded an early reliance on agriculture for subsistence. Another typical hypothesis relates to visibility and surveyed space. Early Developmental period sites may exist, but they have not been identified.

From A.D. 1000 to 1300 along the Middle and Northern Rio Grande and on the tributaries of the Upper Pecos River, the settlement pattern of small scattered sites occupied by nuclear families changed to a more aggregated, small village pattern. The pottery of this period is widely distributed along the Pecos and Rio Grande rivers and along the east slope of the Sangre de Cristo Mountains. The first evidence of a Plains-Pueblo connection is suggested from excavations south of Santa Fe (Allan 1973). Settlements are located along tributaries of major rivers. Instead of one or two structures, villages consist of multiple structures. Circular pit structures used for living or storage may have had ceremonial functions as well.

The A.D. 1000 to 1300 sites are the most numerous for the El Cerrito area, with 14 residential sites identified. These sites range in size from 6 to more than 50 rooms. (The Tecolote Ruin, with ten house mounds, is an example of a larger village.) These villages are on the benches above the Pecos River and its tributaries, with the exception of a mesa-top pueblo near El Pueblo. These villages are roughly contemporaneous with villages established along Arroyo Hondo and Cañada de los Alamos, south of Santa Fe (Dickson 1979) and villages in the eastern Galisteo Basin (Ware 1989). This expanded village settlement pattern coincides with a change in pottery decoration convention from mineral to carbon paint. The resulting types are similar in design style to McElmo and Mesa Verde Black-on-whites of the Mesa Verde region (Mera 1935; Breternitz et al. 1974). Pottery types that are common to these sites are Santa Fe, Wiyo, and Galisteo Black-on-whites, which were locally produced in the Middle and Northern Rio Grande (Mera 1935). Nonlocal ceramic types include Chupadero Black-on-white, which could have come from the Pintada Arroyo settlements in Guadalupe County to the south; Socorro Black-on-white from the Albuquerque and Socorro districts to the southwest (Lang 1982); Wingate and St. Johns Black-on-red, and St. Johns Polychrome from the White Mountains in the Zuni area (Carlson 1970). Eight sites are listed as artifact scatters, reinforcing the pattern of increased use of the area. More survey of the area would likely yield more residential sites within the Tecolote Creek and Cañon Blanco drainages, as well as along the Pecos River.

From A.D. 1100 to 1300 during the Ponil and Cimarron phases, settlements in the Cimarron area clustered around creek mouths and dry creeks. The village locations and a change to more intensive farming strategies suggest that the reliance on agriculture for subsistence had increased. Villages changed from multiroom single-structure sites to multiroom-block settlements. The pottery industry was similar to the Taos area, suggesting greater contact between Cimarron and Taos area populations (Glassow 1980:73-75).

After A.D. 1300, the pattern of population aggregation continued with the establishment and growth of large villages in the Galisteo Basin, the middle Chama River, along the Rio Grande, in the Salinas area, and at Pecos and Rowe pueblos (Stuart and Gauthier 1981; Cordell 1979). During this period no large Pueblo villages are reported for the southwestern part of northeastern New Mexico. Rowe and Pecos pueblos may have acted as population magnets, with use of the area by Rowe and Pecos residents indicated by the small artifact scatters and probable fieldhouses that occur in the area. Evidence of large settlements has been reported for the Pintada Arroyo area southwest of Anton Chico (Stuart and Gauthier 1981). Our knowledge of post A.D. 1300 settlement patterns along the upper Pecos River between San Jose and Santa Rosa is limited by the lack of survey coverage.

The Classic to Protohistoric period in the El Cerrito area (A.D. 1300-1600) is represented by seven sites that are definitely from this period and three additional sites that may have earlier components. In contrast to the preceding period, all but one of the sites are artifact scatters or fieldhouses. The exception is a petroglyph site. In the Middle and Northern Rio Grande at this time, the number of sites decreases but the villages grow to their largest size. Smaller residential sites are less common, with satellite fieldhouses more common (see Lang 1977 for an example from the eastern Galisteo Basin). Besides increased village size, pottery production changes to glaze-painted polychrome and bichrome styles and an organic-based black-on-white decorated pottery termed Biscuit Ware. Kidder and Shepard (1936) indicate that both glaze- and organic-painted pottery were made at and traded in and out of Pecos Pueblo. The complete glaze ware series as defined by Mera (1933) for the Rio Grande occurs in the Pecos Pueblo assemblages (Kidder and Shepard 1936). Continued use of the project area by inhabitants of Pecos Pueblo would be expected. However, the small number of sites that were contemporaneous with the rise of Pecos Pueblo suggest that use of the area was minimal. More settlement pattern information is needed from which to suggest the cause for this apparent absence.

Around A.D. 1300, Pueblo settlement in northeastern New Mexico decreased, with an occupation hiatus suggested by Glassow (1980). North and east of Las Vegas, sites occur with structural and material cultural similarities to well-defined cultural sequences of southern Colorado, western Oklahoma, and west Texas (Lintz 1984; Harlan et al. 1986; Campbell 1969). This regional variant of the Plains Woodland and Plains Village sequences is referred to as the

Upper Canark variant (Lintz 1984:44). The geographic area includes the High Plains section in the Texas-Oklahoma panhandles and the Raton section of the Great Plains in southeastern Colorado and northeastern New Mexico, perhaps as far south as the Las Vegas Plateau. The Upper Canark variant is divided into two geographically and culturally distinct phases that have some temporal overlap: the Apishapa phase (A.D. 1100-1350) and the Antelope Creek phase (A.D. 1200-1450) (Lintz 1984:48, 53).

The Apishapa phase, with only a few absolute dates, is best defined for the Chaquaqua Plateau of southern Colorado and northeastern New Mexico. Site locations include rock shelters, mesa tops along canyon rims, and the more nucleated settlements located on steep-sided buttes and vents. Structures are made from vertical or horizontal slabs and mortar with circular, oval, semicircular, or D-shaped outlines. Definable entryways and interior hearths are rarely present. Subsistence was probably a combination of foraging and horticultural activities and hunting. The lithic tool industry reflects the inferred subsistence practices with small, side-notched Harrell or Washita projectile points the common form. The sites have very few trade wares from the surrounding area, suggesting they were relatively isolated.

The Antelope Creek phase is better dated than the Apishapa phase by radiocarbon and archaeomagnetic dating and ceramic cross-dating. The Antelope Creek phase sites, unlike the more northern Apishapa sites, have a diverse inventory of black-on-white, polychrome, and glaze ware pottery that originated in the Pueblo villages to the west along the Pecos River and Rio Grande. Village sites are on high terraces within drainage basins while other architectural sites occur on steep, sloping terraces, knolls within floodplains, and on isolated buttes (Lintz 1984:52-60). Site sizes range from artifact scatters to villages with 80 structures (Stuart and Gauthier 1981:310). Room sizes and shapes range from small (less than 5 sq m floor space) to large rectangular rooms (up to 60.5 sq m floor space). Wall construction is a combination of slabs, adobe, mortar, and cobbles. The lithic tool industry shows greater specialization and diversity than the Apishapa phase assemblages. Small, side-notched Harrell, Fresno, and Washita are typical projectile point styles. Extensive trade contacts are indicated by exotic lithic materials, shells, and painted ceramics from the Rio Grande and Pecos River pueblos (Lintz 1984:61-64).

In the southwest part of northeastern New Mexico there is a wide distribution of stone enclosures that resemble early Panhandle Apishapa phase structures (Campbell 1969). To date, only the Tinsley sites (Mishler n.d.) and Sitio Creston (LA 4939, Wiseman 1975), south of Las Vegas, have been excavated. The Tinsley site excavations to date are unreported.

The Sitio Creston site is roughly dated to A.D. 1050-1150. It is one of the larger stone enclosure sites recorded for this area and has 12 rooms that constituted 9 structures. Excavation of seven structures yielded a diverse and substantial lithic tool-making industry with all stages of projectile point and biface manufacture represented. Most of the tools were made from locally available Tecolote chert as identified by Warren (n.d). Grinding implements were recovered, but interestingly, more metates than manos were represented. Typically, on sites like this near El Cerrito, manos dominate with very few references to metates. Of interest were the 612 sherds, possibly representing only a few vessels of unpainted utility pottery similar to Taos Plain or Incised. No decorated pottery from the Rio Grande or Western Anasazi areas was recovered. The large number of sherds is unusual for this area where surface sherds on a site rarely number more than ten (Abel 1989b). Wiseman (1975:102) suggests that Sitio Creston fits Campbell's (1969:389-402) characterization of early Panhandle Culture sites, with the exception of the Taos

Plain-like pottery and the corner-notched projectile points.

The Sitio Creston site presents an interesting problem with regard to cultural affiliation and sequences for the southwestern part of northern New Mexico. It is like an orphan in the Upper Pecos River Basin. No comparable work in the area preceded or followed the excavation from which a temporal/cultural sequence can be constructed. Based on the architectural traits and ceramics it is not clearly Puebloan nor are the proponents of the Panhandle focus (Lintz 1984:45) ready to accept it as a manifestation of the Upper Canark variant.

The limited descriptions of the Ponil phase architecture and material culture for the Cimarron area suggest a similarity to the Sitio Creston site (Glassow 1980:74). Ponil phase sites and Sitio Creston have Taos Plain or Incised. Ponil phase sites also may have Taos Black-on-white or Kwahe'e Black-on-white supporting an interpretation of cultural affiliation with the Pueblo populations. Perhaps an important difference is the clear inference of horticulture for the Ponil phase sites and no evidence of horticulture at Sitio Creston. To further stretch the suggestion of similarity between the south Las Vegas area and the Cimarron district, the Tecolote Ruin may be analogous to the Cimarron phase sites, which are multiroom structures with Santa Fe and Galisteo Black-on-white. Therefore, are the single-room structures common to the upper Pecos River and its tributaries suggestive of a Puebloan frontier occupation that preceded the full-scale village occupation of Tecolote Ruin? Is the Sitio Creston site an early expression of the Panhandle sequence as Wiseman suggests? Is it analogous to the small farming communities of the Cimarron District?

Stone enclosures occur in the El Cerrito area, but their relationship to the Upper Canark variant and the adaptation represented by Sitio Creston is unknown. Stone enclosures as they occur around the project area may be the remains of collapsed masonry walls or unstacked rocks that served as walls. They occur in frequencies from one to as many as twelve to a site. Generally, they have fairly extensive lithic artifact assemblages including grinding implements and the debris and finished products of chipped stone tool production. Ceramics, if they occur at all, are present in very low numbers and cannot always be directly associated with the stone enclosure. Nine sites with stone enclosures located near El Cerrito are on mesa tops, while only one is on the river terrace. Site size as measured by extent of the associated artifact scatter ranges from 200 sq m to 571,200 sq m. The sites with the largest areas are located at lithic material quarries, so that size is a reflection of repeated use, rather than the short-term occupation of a stone enclosure.

With the apparent abandonment of the plains frontier by Puebloan groups after A.D. 1300, contact between the Pueblo and Plains groups may have been more common or formalized. Goods exchanged from the Plains included buffalo robes, pipes, distinctive bone and stone tools, and probably an array of perishables, like dried meat. In return, the Pueblos traded farm goods, pottery, turquoise, obsidian, and perhaps goods from other regions like shells. Lintz (1984:59) lists 18 ceramic types that have been recovered from Antelope Creek phase sites. The types may have originated in the Acoma, Zuni, Hopi, Rio Grande pueblos, and Sierra Blanca regions. This array could result from direct long-distance trade or from exchange conducted at trade centers. By the 1500s the latter was a well-established practice. Reference to east-west trade routes from Acoma, Zuni, and Hopi to Plains gateway pueblos or onto the Plains are common in the literature (Scurlock 1988:35-38).

The issue of a hiatus between A.D. 1350 and 1500 along the eastern slopes of the Sangre de Cristos begs many questions. If it applies to the Upper Pecos River settlement when did it occur and how far into areas previously occupied by Pueblo groups did it extend? A question that many researchers are concerned with for the protohistoric period is when did Athabaskan groups begin to have an effect on Puebloan settlement patterns and land use? Were the "dog nomads" in the area before A.D. 1500 in sufficient numbers to affect settlement and land use? Or were the early buffalo hunters along the east Sangre de Cristo Mountains transformed agriculturalists forced to rely more on a hunting economy due to decreased success at farming (Stuart and Gauthier 1981:315)?

The best date for the presence of established Athabaskan-speaking peoples in New Mexico is A.D. 1525 (D. Gunnerson 1974). This date is based on a reference to the Teyas attacking Pecos 16 years before Coronado's arrival. The attack failed, peace was made between the Pecos and Apache group, the Teyas left for the Plains and the two groups maintained trade relationships. This date is probably a benchmark for when the Apaches were present on the western periphery of the Plains in sufficient numbers to be affected by either social or economic factors that would lead to raiding. Pecos reportedly was the strongest of the pueblos so it is likely that they would have been attacked last. The records do not state how early some of the villages in the Galisteo Basin and along the Rio Grande may have been raided. Apache migration south may have occurred steadily from about 1,000 years ago (Brugge 1983:489). One proposed hypothesis is a southward migration following buffalo herds and eventually filling a niche abandoned by agriculturalists (D. Gunnerson 1974). Another suggests that the migration was triggered by environmental factors that led to food shortages threatening a growing population (D. Gunnerson 1974).

Because the Apaches probably did not arrive along the east slope of the Sangre de Cristos and immediately raid Pecos, the strongest pueblo, there must have been a period when the Apaches would have been in and out of the area either following the buffalo herds or to escape severe Plains weather in the winter. Of course the question is how long was that period and how can we differentiate early Apache occupations from other hunting and gathering adaptations?

Six Jicarilla Apache sites have been identified in the El Cerrito area. They are dated between A.D. 1500 and 1860 and therefore do not help clarify the problem of when the Jicarillas first used the Upper Pecos River. These sites are listed as artifact scatters and were probably dated by the presence of micaceous paste pottery.

Like the rest of northeastern New Mexico, nondiagnostic lithic artifact scatters are the most common site type in the El Cerrito area. Nondiagnostic lithic artifact scatters comprise 39 percent of the total site sample (50 sites). They have been found on mesa tops (21), low rises (14), ridges (4), flat plains (3), and hill slopes (8). Four scatters were located on a bench or terrace above the Pecos River. LA 84318 falls into the latter category, since it is on the first bench above the river. The site distribution reflects the focus on mesa and ridge-top surveys and the fact that river terraces and benches are a less dominant landform. Proportionally, site densities with respect to landform may not be that different, although this needs to be demonstrated. Site sizes, when they are reported, range from 450 to 660,000 sq m, with 4 sites less than or equal to 1,000 sq m; 11 sites 1,340 to 5,000 sq m; 5 sites from 5,730 to 10,000 sq m; 7 sites from 10,460 to 19,000 sq m; one site at 80,800 sq m; and one site at 660,000 sq m (n = 29 sites). Only one of the very large quarry sites lacked diagnostic artifacts and was included in this category. The other sites appear to represent hunting and gathering activities, without lithic raw material procurement as a major focus. Twelve sites have manos suggesting some food processing, although manos are a common occurrence on sites from all periods.

How nondiagnostic lithic artifact scatter sites reflect settlement and subsistence patterns is a major question for most of New Mexico. To date no extensive analysis of the lithic artifact scatters has been done. This research design may be able to shed some light on the subject.

The Historic Period

The Historic period, as it is presented here, spans A.D. 1540, Spanish contact with southwestern native peoples, to the close of World War II in 1945. Because the Historic period may not be well represented at LA 84318 this overview will be very general. More detailed overviews and bibliographies for detailed reading for the historical period can be found in Jenkins and Schroeder (1974), Lamar (1966), Larson (1968), Bannon (1979), Kessell (1979), and Athearn (1989).

Spanish Exploration and Native American Contact. Prior to 1540, Native American contact with the Spanish was restricted to the journeys of Cabeza de Vaca and his companions in 1528 and the expedition towards Hawikuh at Zuni by Fray Marcos de Niza in 1539 (Bannon 1979:16). Enough interest was generated by these expeditions' claims of golden cities to warrant further exploration by Francisco Coronado in 1540.

Coronado arrived at Hawikuh in 1540 to find no gold and hostile Zunis, whom he defeated. From Zuni, Coronado sent out expeditions to Moki (Hopi), the Grand Canyon, and east to Tiguex, Taos, and Cicuye (Pecos Pueblo). No gold or precious metals were found at any of these places. From Pecos, Coronado traveled 77 days onto the Plains in search of the rich land of Quivira. Again no wealth was found and the troops became restless to return home. In 1542, Coronado's army returned to Mexico with no reports of wealth and only the scars of battles with Indian villages and an extreme and inhospitable environment (Bannon 1979:17-27; Jenkins and Schroeder 1974:14-17; Bolton 1964).

The interaction between Coronado's forces and the Native Americans was either amiable or forced, depending on whether Coronado's forces stayed long and stretched the resources of the occupied village, like Tiguex (Kuaua) or Hawikuh. The Native Americans often presented the Spanish with supplies and gifts, either out of generosity or fear. The Native Americans also were aware of the consuming Spanish interest in gold and silver and fed this predilection with more tales of fantastic cities like Quivira. The Native Americans hoped that the Spanish would be victimized by fierce Plains tribes or the harsh Plains environment. To some extent the stories worked as the Spanish resources were exhausted by fruitless and difficult travels.

Important to the El Cerrito area are the accounts of travel out of Cicuye (Pecos) by Alvarado and Coronado. Both expeditions followed the Pecos River to the southeast passing through Villanueva and close to El Cerrito (Bolton 1964). Neither expedition reported the presence of outlying villages nor Apachean encampments. This indicates that the Pecos River was mainly uninhabited during the middle sixteenth century. However, the Spanish were guided along well-established trails, suggesting that movement between the Plains and Pecos was a regular event. Regular winter trading between Pecos and Plains Indians may have been well established by 1540. There may have been a symbiotic relationship with Pecos supplying corn to the Plains Indians, who reciprocated with buffalo hides and meat (Spielmann 1989:103-104). Therefore, the remains of many years of camp sites should be present along the Pecos River. Some of the temporally nondiagnostic lithic artifact scatters that occur along the Pecos River may result from Plains-Pueblo interaction.

For forty years after Coronado, there were no expeditions into the far northern borderlands. Coronado's "failure" had cooled the monarch and vice-regal interest in further exploration. Between 1581 and 1590, there were four smaller expeditions, two sanctioned and two illegal. Antonio de Espejo's expedition in 1582 returned to Mexico along the Pecos River and commented on the rugged condition of the trail. The expeditions were mostly unsuccessful, except for establishing additional travel routes and ascertained the ill-fate of priests who had remained behind in New Mexico after the 1542 and 1581 expeditions (Bannon 1979; Jenkins and Schroeder 1974; Kessell 1979).

Pre-Revolt Spanish Colonial Period (1598 to 1680). Don Juan de Oñate established the first "permanent" settlement in New Mexico at San Gabriel in modern-day San Juan Pueblo. From here, Oñate and his lieutenants traveled to the pueblos extracting allegiance from village leaders or representatives. Harsh treatment by Oñate of Indians and discontent among the settlers, partly incurred by Oñate's penchant for long expeditions, resulted in his recall and replacement in 1609 by Don Pedro de Peralta, the founder of Santa Fe. Armed with specific instructions for establishing the settlement, Peralta with the aid of Indian labor, constructed the seat of Spanish administration in Santa Fe (Bannon 1979:36-40; Kessell 1979:79-93).

Between 1610 and 1680 the records are scarce because of the wholesale destruction of Spanish civilization during the Pueblo Revolt. The economic system of *encomienda* was used by the Spanish to exact tribute from pueblos in support of the military and administration of the colony. The *encomienda* abused Native American labor and stressed the Pueblo economy beyond a comfortable carrying capacity (Jenkins and Schroeder 1974:20). Competition between the missions and the secular government for Native American labor and fealty resulted in constant fighting and unrest (Kessell 1979). The Spanish raided Apache camps for slaves and in turn the Apaches aggressively raided Pueblos and outlying Spanish haciendas (Kessell 1979:218-222).

Under Spanish rule, the economic suppression through the *encomienda* and the subjugation of native religious practices by the missions made the plight of the Indians untenable. Below average spring and annual precipitation between 1645 and 1680 probably reduced farm productivity to the point where the pueblos could not support themselves and the Spanish (Rose et al. 1981). Finally in 1680, as a culmination of intervillage cooperation, the Pueblo Revolt was begun (Bannon 1979:82-83).

In terms of the archaeological record there would be little change in the site types generated by the Plains-Pueblo-Spanish interaction. Artifact scatters or camp sites would probably look Puebloan, as most pottery would be from Pecos or the Rio Grande pueblos. The lithic materials would be local or Rio Grande types because they were abundant, and small amounts of Plains lithic materials, like Alibates or Tecovas chert, could have been left by Plains or Pueblo travelers. Small amounts of metal might have been discarded, but would not be attributable to

Spanish or Indian occupation.

The most mentioned Plains trade partner for Pecos were the Faraon Apaches (Kessell 1979; Jenkins and Schroeder 1974) later called the Jicarilla Apaches (Gunnerson 1987:107.) The Jicarilla Apaches were semisedentary and farmed by the middle to late 1600s, but before that time were involved in the symbiotic relationship mentioned above. As nomads, the Jicarilla Apache camp remains would not have differed from other Plains groups or traders from Pecos. Since sedentary Jicarilla Apaches would have farmed, corn would not have been an important trade item, so it is unclear what would have been exchanged with Pecos. Ceramics, called Ocate Micaceous, are diagnostic artifacts of Jicarilla rancherias or farmsteads (Gunnerson 1969:26). The largest numbers of these ceramic types have been recovered from excavations in the eastern foothills of the Sangre de Cristo Mountains in association with semipermanent residences. The association between a residential lifestyle and ceramics suggests that the occurrence of large numbers of micaceous ceramics at a camp site would be unlikely. Few dated Apachean sites from this period have been excavated providing no conclusive evidence of when the Apaches switched from a nomadic to semisedentary lifestyle. In addition to few early dates, similarities in material culture and stone tool technologies between Apaches, mobile Pueblo groups, and other Plains groups make distinguishing between groups a difficult exercise.

Pueblo Revolt (1680 to 1693). The Pueblo Revolt in 1680 drove the Spanish from New Mexico beginning a brief period of Pueblo rule. With the Spanish gone from New Mexico, the quality of life for the Indian population probably improved minimally. Factionalism within and between pueblos surfaced, as old enmities between Tano, Keres, and Tewa were revived (Kessell 1979:240-1). Relief from the 35 years of below average precipitation probably increased productivity and ameliorated food shortages. However, the protection offered by the Spanish from raiding Apaches was gone and peripheral pueblos like Galisteo were more vulnerable (Jenkins and Schroeder 1974:22).

After three unsuccessful attempts by Spanish governors to reclaim New Mexico, Don Diego de Vargas returned Spanish rule to New Mexico. From 1692 to 1696 Vargas systematically vanquished rebel groups and reconciliated loyal pueblos, like Pecos (Kessell 1979:249). The second era of Spanish administration, missionization, and settlement began with Vargas's second return with Franciscans and a large group of settlers in 1693 (Bannon 1979:88).

Spanish Colonial Period (1696-1821). From 1696 to 1821, the Spanish settlement of New Mexico encompassed a larger area than pre-Revolt times. Administration was expanded and restructured to accommodate the new areas. The Pueblo Indian populations continued to shift geographically and restabilize, while the Comanche and Ute tribes raided Spanish and Puebloan settlements. Secular parishes were established at the pueblos and old conflicts between church and state were rejoined (Jenkins and Schroeder 1974:22-30).

The first settlers who came with Vargas were quickly joined by more. To accommodate the new population influx, a formal land grant procedure was implemented. The system provided land to communities and heads of large families. These grants divided arable land among households and designated common lands for community subsistence. The grants extended as far from the administrative centers as the raiding Utes and Comanches would allow. Legally, the

Spanish governors were to ensure that grants did not encroach on Pueblo lands, which were also considered as land grants. In reality many small community and individual settlements extended onto Pueblo lands because they often incorporated some of the best farm land (Hall 1987; Westphall 1983; Bowden 1969).

The main administrative and military official remained the captain general/governor who was appointed by the viceroy of New Spain. However, New Mexico was divided into eight *alcaldias,* which were administered by an *alcalde* mayor. The villages within the *alcaldia* were administered by a *cabildo* or town council (Jenkins and Schroeder 1974:26).

Puebloan populations reorganized during the attempted 1696 revolt, and Tewa and Tano villagers moved to Hopi and Acoma to escape retribution. In 1699 Laguna was established by refugee populations and many of the Galisteo and middle Rio Grande pueblos were permanently abandoned. Inhabitants of San Cristobal and San Lazaro moved to Santa Cruz de La Cañada, but were moved to San Juan, Santa Clara, and San Ildefonso with the establishment of the villa and Santa Cruz de La Cañada. Pueblo populations moved out of peripheral areas into more centrally located villages. This aggregation was sparked by increased Ute and Navajo raids and a depletion of the population by epidemics in the early eighteenth century (Jenkins and Schroeder 1974:23-26).

Between 1700 and 1780, the Comanches and Utes had pushed other nomadic groups, like the Jicarilla Apaches, farther south. The Comanches raided and traded with the Spanish and Pueblo settlements (Jenkins and Schroeder 1974:23-26). Spanish and Pueblo traders made regular trips onto the plains as *viageros* or comancheros (Scurlock 1988; John 1987). The Jicarilla Apaches gradually moved closer to and into the Sangre de Cristo foothills, mingling more with the residents of Taos, Picuris, and Pecos pueblos (Gunnerson 1987:136). As a result of increased interaction between Plains Indians and the Spanish a new ethnic class, the *Genizaros,* was formed. Genizaros were Indians without tribal affiliation, like former slaves. Genizaro numbers were large enough during this period that the Spanish encouraged them to settle on the frontiers as buffers against Comanche and Ute raids (Jenkins and Schroeder 1974:26; Levine 1987).

Soon after the establishment of the *Provincias Internas* in 1776, a new military governor was appointed, Juan de Anza. In eight years of military campaigning, Anza made treaties with the raiding Comanches, Jicarilla Apaches, Navajos and Utes (John 1987:544; Jenkins and Schroeder 1974:26-28). This tenuous peace allowed further expansion by Spanish settlers and set up the Comanches as preferred trade partners. The Spanish trade was vital to the Comanches who accommodated Spanish traders in every way possible (John 1987:543). It is between 1786 and 1821 that the large northern community grants were made as settlement extended down the Pecos and Canadian rivers and north of Abiquiu (Jenkins and Schroeder 1974:29).

With the confirmation of the San Miguel del Vado Grant, a large segment of the Upper Pecos River could be settled. San Miguel del Vado, established in 1794, and San Jose del Vado, established in 1803, were small subsistence agricultural communities that invested heavily in the comanchero trade with the Plains Indians (Kessell 1979:415; Levine 1987; Bowden 1969:734-744). Various attempts by the Spanish and Mexican governments to quash the comanchero trade were met with open and armed resistance. Even with the trade relationship, the residents of San Miguel and San Jose were not excluded from occasional Indian depredation. Also, Jicarilla Apaches continued to live along the Pecos River into the 1860s and they often stole livestock and other food items from the communities (Leonard and Loomis 1941:12-14; Gunnerson 1984:74).

Whether El Cerrito was established by the end of Spanish rule is not known. There are indications from oral histories that a few families may have settled there before 1821. However, no strong documentary or archaeological evidence has been found to support the oral accounts (Heffington, pers. comm. 1991).

The Mexican Period (1821-1846). The Pecos River grants below Pecos Pueblo continued to be settled after Mexican independence was won in 1821. The continued growth of the San Miguel area can be seen in the 1827 census, which listed 714 heads of household (Carroll and Haggard 1942:38). The Anton Chico Grant was confirmed in 1822 completing the settlement framework for the Upper Pecos River (Leonard and Loomis 1941:4). The subsistence pattern of agriculture coupled with a thriving comanchero trade continued and was joined by fairly successful stockraising (Levine 1987:562-564). Irrigated crops included corn, wheat, vegetables, cotton, and tobacco. Intervillage exchange helped to distribute goods and compensate for shortages caused by an inability to raise yearly surpluses.

An additional factor in growth along the Pecos River was the opening of the Santa Fe Trail in 1821 (Jenkins and Schroeder 1974:34). San Miguel de Vado became the port-of-entry into the Mexican Territory from the United States. Although it is only briefly mentioned in the accounts, some of the goods probably detoured at the Pecos River and headed south to Chihuahua to avoid tariffs in Santa Fe. Undoubtedly some of these goods found their way into the local trade networks, marginally increasing the local standard of living.

The El Cerrito Area and the American Period (1846 to 1960). The El Cerrito area history is not well described in the literature from its establishment sometime between 1820 and 1844 until 1904, when the Court of Private Land Claims drastically reduced the San Miguel De Vado Grant. Presumably settlement occurred as people moved south from San Miguel and San Jose towards Anton Chico. Local lore holds that El Cerrito was also known as "La Junta" or "The Gathering Place." This hearkens back to Hispano and Genizaro participation in the Comanchero trade. John (1987:544) suggests that between 1800 and 1830 the Comanches stopped coming into Spanish settlements to trade partly because of a fear of European diseases. The local oral history suggests that some Indians continued coming to El Cerrito to trade and raid after 1830. Other evidence of the proximity of Indians to El Cerrito is the local account of 3-ft thick walls with gunsight windows at the adobe long house that was one of the earliest built in the village. The 3 ft thick walls insulated the residents from weather extremes and hostile visits.

Like other communities along the Pecos River, El Cerrito inhabitants relied on raising livestock and herding and subsistence farming for their livelihood. In 1900, El Cerrito population was 136 people comprising 30 families. Most of the heads of household worked in livestock. Eight stockraisers employed herders and grazed their sheep extensively on the mesa-top common lands. This continued until 1916, when the United States took control of public domain lands. The land was acquired when only 5,024 acres of the 315,300 acre San Miguel del Vado Grant were confirmed by the Court of Private Land Claims in 1904. Twelve years after the San Miguel del Vado Grant was reduced, the pattern changed again as the United States opened the public domain lands to homesteading (Nostrand 1982:112). The once vast grazing lands became a patchwork quilt of ownership that could not support the large local herds. Anglo and Hispano stockraisers competed for the same land and the El Cerrito villagers were reduced to farming and livestock raising on 117.65 acres (Nostrand 1982:111).

A single-room homestead built of masonry by the Quintana family remains 30 m northwest of LA 84318. This rudimentary structure was probably built to perfect the homestead claim. The homestead was requested in 1916 (J. Quintana, pers. comm. 1991).

From 1916 until the early 1930s, former stockraisers and herders were able to find work with the railroad and seasonally on farms. The Great Depression eliminated these work sources, reducing many residents to small-scale subsistence farming supplemented by hunting and gathering. The continued low employment opportunities started an exodus from the village that culminated in the mid 1950s when only eight families, mostly older residents, remained. Families had left El Cerrito for the better opportunities of Trinidad, Pueblo, and Denver, Colorado. A process that began with the disenfranchisement of the land and population turned a stable village into a veritable ghost town by 1960.

SURVEY METHODS AND RESULTS

The survey was conducted by one person using pedestrian transects that were 3 m wide until 100 percent of the project area was examined. The survey began 30 m (100 ft) north of the bridge and continued for 79 m (260 ft). Not including the road bed, the surveyed area was 18 m (58 ft) wide and it covered an area of .14 ha (.35 acres). The survey identified one archaeological site, LA 84318, with a portion of it within the project right-of-way. In addition, the remains of a post-1916 homestead were observed 30 m (100 ft) northwest of the project area. No cultural material or features directly associated with the homestead were observed within or immediately adjacent to the project area.

As prehistoric artifacts were encountered, they were pinflagged for recording and to show their spatial distribution. The recorded lithic artifact attributes included material type, morphology, function, condition, platform type, percentage of cortex, type of cortex and length, width, and thickness in millimeters. A total of 56 artifacts, an estimated 75 percent of the right-of-way assemblage, was recorded. The site area outside the right-of-way was examined for diagnostic artifacts. No ceramics were found within the right-of-way.

After recording the artifacts, the site was recorded on a Laboratory of Anthropology site form, located on a USGS 7.5' quadrangle map, and the site and surrounding area were photographed.

The survey recording provided inconclusive results about the nature and extent of the cultural deposits. To better assess the potential for subsurface deposits, a limited testing program was conducted. The remainder of this report focuses on results of the investigation at LA 84318.

SITE DESCRIPTION

LA 84318 is a sherd, lithic, and ground stone artifact scatter that covers about 40,000 sq m. Surface visibility of the artifacts is greatly affected by the amount of grassy ground cover. Areas with a thick coverage show a very sparse artifact distribution. Areas where the grass cover is sparse or missing exhibit dense artifact concentration. Besides the aboriginal artifacts, the surface is also littered with historic Euro-American trash and a single-room masonry structure, the Quintana homestead, present outside of the right-of-way.

The site is [redacted] in San Miguel County, New Mexico. Artifacts were observed on both sides of the road and in the road bed, which is built above the natural ground level. The source of the road bed artifacts is unknown.

The [redacted]. The first bench is from the water level to the top of the prehistoric floodplain. This bench very gradually slopes up and away from the river and is covered with tall pasture grasses and cholla cactus along the road bed. The river has cut deep into the alluvial soils which are fairly homogeneous. The second bench is 1.2 to 1.6 m high and appears as a low rise. This bench consists of redeposited, tabular sandstone blocks and has a sparse to medium cover of soil, grasses, cactus, and juniper. The rocky substratum continues to the north, terminating at the foot of the canyon slope. In general the soil depth is very shallow across the second bench.

The artifact scatter is about 100 m north to south by 40 m east to west. The surface artifact scatter is sparse on the first bench above the river, except where the plant cover is patchy, where the road meets the second bench, and to the south of the road where there is no grass cover. In the latter area, the artifact density is high, 10 to 20 artifacts per sq m. The portion of the site north of the bend in the road is on top of the second bench with a surface artifact distribution higher than other parts of the site. In this area, however, the shallow soil depth indicates only a surface scatter. On the north side of the road on the first bench, the artifact scatter is very diffuse. Based on surface artifacts, one might suggest that the distribution is from redeposited road fill. However, the testing showed that substantial subsurface deposits occur in this area.

Surface artifacts probably number about 500 over the entire site, with 100 in the right-of-way. The main artifact type is stone tool production and core reduction debris. Mostly core flakes are visible, but some cores and biface flakes occur. Material types include fine- to medium-grained chert, chalcedony, quartzite, and siltstone. These materials are locally available from the terrace gravel in and on top of the canyon. Imported obsidian is common but in low numbers and occurs as biface flakes. No temporally or functionally diagnostic chipped stone tools were observed.

Potsherds occur in low numbers, with less than 20 observed on the surface. The potsherds include Red Mesa Black-on-white, Tewa Red, and micaceous utility wares. One very small and thin sherd may be an example of Ocate Micaceous as defined by Gunnerson (1969:26-27), although its small size makes identification difficult.

No surface features were observed. The extent of the scatter and the potential for subsurface remains, as shown by the testing results, indicates that LA 84318 is probably a repeatedly occupied camp site for Archaic period, Pueblo, or Plains groups until as late as the early 1800s. Historic refuse is lightly scattered across the site surface. It post-dates 1920 and may be redeposited sheet trash from the homestead northwest of the site or road trash.

LIMITED TESTING RESULTS

Limited testing was conducted because of the low visibility of the surface artifact scatter and to determine if subsurface deposits existed. The test excavations were kept to the minimum necessary to determine the nature and extent of the subsurface deposits.

Methods

Four 1 by 1 m test pits were placed within the right-of-way (Fig. 2). Test Pit 1 was placed at the base of the second bench on the south side of the road where artifact density was relatively high for the right-of-way distribution. Test Pit 2 was placed on the north side of the road, across from Test Pit 1, to investigate subsurface deposits in an area where the surface artifact density was very low. Test Pits 3 and 4 were placed near the first two pits to provide additional information on the nature and extent of the subsurface deposits. The test pits were oriented on a north to south axis and were spaced so that they could be incorporated in a grid system if additional data recovery proved necessary.

The test pits were excavated in arbitrary 10 cm levels. Picks and shovels were used to loosen and remove the soil. All soil was screened through ¼-inch hardware mesh. The artifacts were collected and placed in bags labelled with the site number, test pit number, arbitrary level, and contents. Excavations continued until no more artifacts were recovered or until a rocky substratum associated with the second bench was encountered.

After completing the four test pits, the site was transit mapped. The map included the fence, road, first and second bench contact, and the test pits. The four test pits were backfilled. A site datum was established at the southwest corner of Test Pit 2, as shown in Figure 2.

Stratigraphy

The soil strata defined in the test pits are thick, suggesting fairly lengthy deposition periods. The strata found on the north and south sides of the road are not identical and the modern ground surface is 28 to 64 cm higher on the north side of the road. While the overall stratigraphy is comparable, there are enough differences to warrant separate description and discussion.

Test Pits 1 and 3 were on the south side of the road. Stratum 1 was 6 to 10 cm deep and consisted of loose to compacted sandy alluvium mixed with small gravel, grass, and roots. The prehistoric artifacts were more numerous in Stratum 1 than on the surface. Both test pits also had historic domestic and road refuse.

Stratum 2 was a continuation of Stratum 1 except there was no grass and a decreased amount of organic material. It continued to 50 cm deep. Occasional charcoal flecks were noted

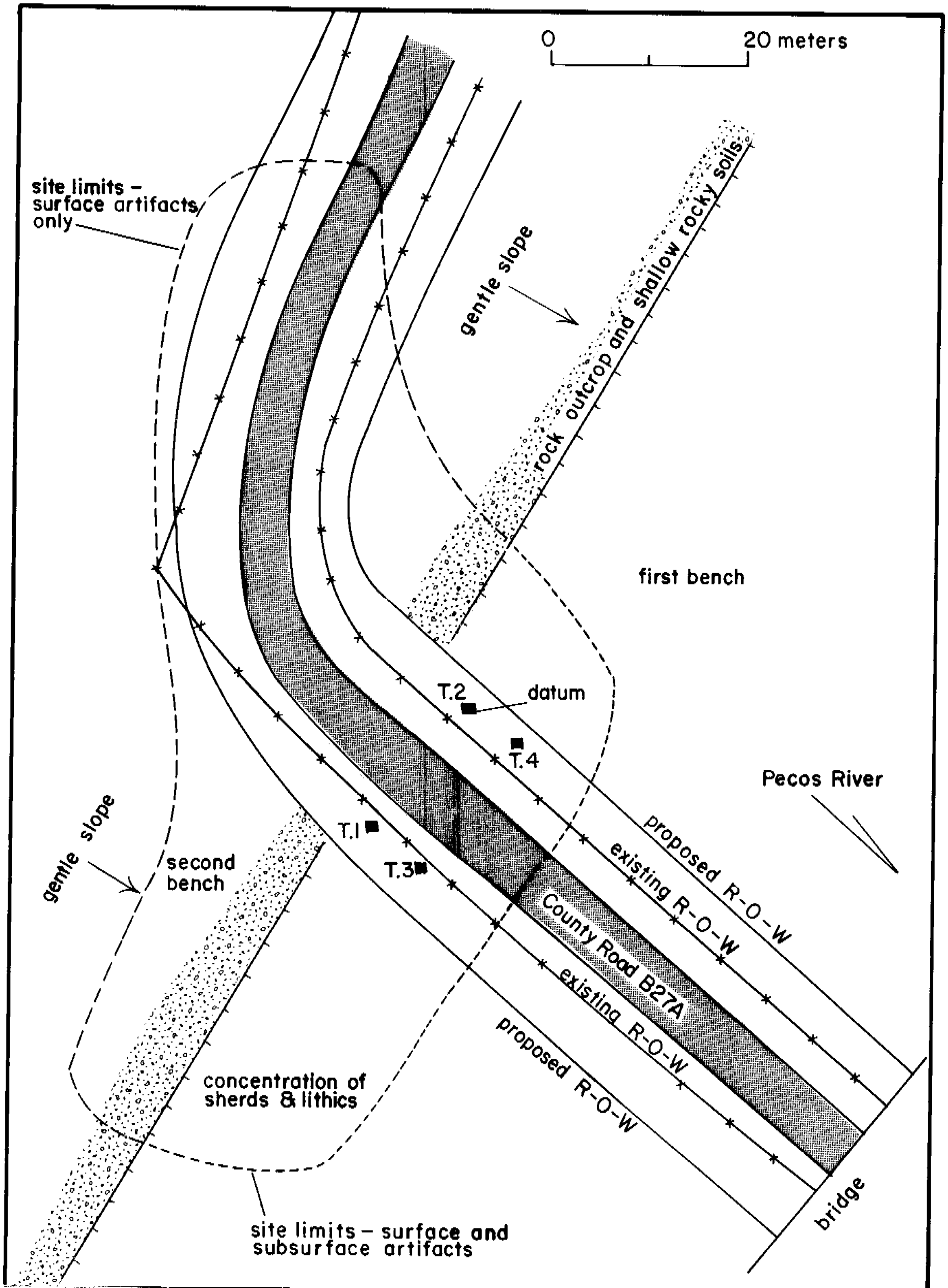

Figure 2. Site map, LA 84318.

throughout the stratum. Gravel was never abundant and varied from pea- to fist-size. Historic artifacts were not present in each 10 cm level within the stratum and Test Pit 1 did not have historic artifacts below 20 cm. The historic artifacts in Test Pit 3 included shoe parts, tin can fragments, bottle glass fragments, iron-stone fragments, and sherds of Tewa and micaceous plain wares. Prehistoric artifacts vary in number from 15 to 35 within the 10 cm levels. A large, early stage chert biface was found in Level 2 of Test Pit 1. The prehistoric artifacts are coated with calcium carbonate in the lower levels of Stratum 2.

Stratum 3 was 50 to 70 or 80 cm deep. The soil was still sandy alluvium, but more reddish brown with less gravel and more calcium carbonate. There were no historic artifacts and the prehistoric artifacts continued to be coated with calcium carbonate. No charcoal was noted in this stratum. The number of artifacts ranged from 10 to 20 and decreased dramatically between 70 and 80 cm deep. The lack of historic artifacts suggests that Stratum 3 was prehistoric and not altered by historic plowing or road grading.

An auger test placed in Test Pit 3 was from 80 to 190 cm deep. Stratum 3 continued to 175 cm where it changed to a finer, siltier sand. No artifacts or charcoal were noted in the auger test.

Test Pits 2 and 4 had different soils. Test Pit 2 had a loose dark brown sandy alluvium 40 cm deep with historic artifacts 20 cm below the surface. This level, which will be called Stratum 4, contained lithic artifacts and occasional flecks of charcoal. The level ended with an outcrop of tabular sandstone blocks that was a subsurface extension of the second bench. Excavation stopped at this level.

Test Pit 4 was more like Test Pits 1 and 3. Stratum 1 was a loose to compacted dark brown sandy alluvium with grass and organic material reaching a depth of 10 cm. Charcoal and historic and prehistoric artifacts were mixed.

Stratum 2, continuing to 40 cm deep, was similar to Stratum 1 except with more gravel. The lithic artifacts increased with depth. The historic artifacts were few and small and may have been transported in rodent burrows.

Stratum 3 was dark brown sandy alluvium mixed with pea- to fist-size gravel. Rodent burrows were present, mottling the soil color and texture. Calcium carbonate increased with depth and coated the artifacts. Historic artifacts were small, low in frequency, and did not occur below 55 cm. Again, the historic artifacts were probably transported by rodents because of their small size and low numbers. Excavation continued to 80 cm below the surface; the lithic artifacts no longer occurred below 75 cm.

At 80 cm deep an auger test was placed in the floor of the test pit and went to 200 cm deep. The soil was soft brown sand, with occasional calcium carbonate flecks and patinated gravel. No artifacts or charcoal were recovered.

Test Pits 1, 3, and 4 have similar stratigraphy. Stratum 2 in Test Pit 4 is looser and has less historic refuse, but it has more visible rodent disturbance. The historic artifacts in Test Pit 4, Stratum 2 may result from vertical migration in rodent burrows. The historic refuse in Test Pits 1 and 3, Stratum 3, is more abundant and cannot be explained away as rodent deposited. The refuse is domestic and may come from the homestead occupation. The fact that the historic refuse is mixed throughout the upper 50 cm suggests that more than rodent activity is the cause. Historic plowing, perhaps during the homestead occupation, may account for the mixing. Stratum 3 in Test Pits 1,3, and 4 may have the best potential for study, since the level is not a mix of prehistoric and historic period occupation trash.

Test Pit 2 is curious because Stratum 4 appears to be redeposited or of a different nature than the fill found in Test Pit 4. One suggestion is that the fill results from road construction and that the second bench was more exposed on the north side of the road prior to road construction. If the soil from Test Pit 2 was redeposited during road construction, then why is there not more evidence of this redeposition in other test pits? To determine if the differences are isolated more excavation is needed.

Chipped Stone Analysis and Results

The chipped stone analysis focused on providing baseline information about raw material procurement, lithic raw material reduction strategies, and tool use and discard. By studying the morphological attribute and use patterns, hypotheses about how the site fits into the organization of the settlement and subsistence system can be offered. Changes in the artifact attribute and use patterns through depositional time may reflect different site activities and therefore different subsistence strategies.

To establish the data baseline, the lithic artifacts were analyzed according to Office of Archaeological Studies *Standardized Lithic Artifact Analysis: Attributes and Variable Code Lists* (OAS Staff 1990). The recorded attributes were material type and quality, artifact morphology, artifact function, percentage and type of dorsal cortex, portion, dorsal scar orientation, distal termination, thermal alteration, wear pattern, edge angle, and length, width, and thickness in mm.

Analysis Results

A total of 398 lithic artifacts was recorded in the field (55) or recovered from test pits and analyzed in the lab (343). Lithic artifacts were recovered from all arbitrary levels within the test pits. The lithic artifacts reflect core reduction and tool production and maintenance. Locally available materials were the most numerous, with nonlocal materials represented by obsidian and Alibates chert.

Locally available materials represent 92.6 percent (369) of the assemblage. The distribution of material types is shown in Table 3. By far chalcedony is the most common type, undoubtedly reflecting its ubiquity in the gravel sources that are abundant in the Pecos River bed and on the canyon edge. Chalcedony was probably not selected over other materials for its suitability because its texture is no better than the locally available but less abundant chert, quartzite, or siltstone. Artifact morphology distributions are similar for all local types, supporting the assumption that chalcedony was not more suitable. The local materials reflect all stages of core reduction and tool production, with core and biface flakes of chert, chalcedony, and siltstone present. The lack of biface flakes of other materials may be a function of sample size.

Table 3. Material Types by Artifact Type

	MATERIAL											Row Total
	Chert	Alibates chert	Foss. chert	Chalce-dony	Obsidian	Jemez, generic	Polva-dera	Igneous	Silt-stone	Quart-site	Q. sand-stone	
MORPHOLOGY Indeter-minate	1 8.3% 2.3%			8 66.7% 2.8%	2 16.7% 22.2%				1 8.3% 4.8%			12 100.0% 3.0%
Angular debris	10 10.1% 23.3%			79 79.8% 27.2%	1 1.0% 11.1%		1 1.0% 50.0%	1 1.0% 20.0%	6 6.1% 28.6%	1 1.0% 25.0%		99 100.0% 24.9%
Core flake	24 11.2% 55.8%	1 .5% 100.0%	1 .5% 100.0%	157 73.0% 54.1%	2 .9% 22.2%	5 2.3% 29.4%		4 1.9% 80.0%	13 6.0% 61.9%	3 1.4% 75.0%	5 2.3% 100.0%	215 100.0% 54.0%
Biface flake	5 8.2% 11.6%			38 62.3% 13.1%	4 6.6% 44.4%	12 19.7% 70.6%	1 1.6% 50.0%		1 1.6% 4.8%			61 100.0% 15.3%
Bipolar flake				1 100.0% .3%								1 100.0% .3%
undeter. flake				2 100.0% .7%								2 100.0% .5%
Unidirec-tional core				1 100.0% .3%								1 100.0% .3%
Multidirec-tional core	2 66.7% 4.7%			1 33.3% .3%								3 100.0% .8%
Cobble tool	1 100.0% 2.3%											1 100.0% .3%
Middle stage uniface				1 100.0% .3%								1 100.0% .3%
Middle stage biface				1 100.0% .3%								1 100.0% .3%
Late stage biface				1 100.0% .3%								1 100.0% .3%
Column Total	43 10.8% 100.0%	1 .3% 100.0%	1 .3% 100.0%	290 72.9% 100.0%	9 2.3% 100.0%	17 4.3% 100.0%	2 .5% 100.0%	5 1.3% 100.0%	21 5.3% 100.0%	4 1.0% 100.0%	5 1.3% 100.0%	398 100.0% 100.0%

The assemblage is basically the same for both sides of the road, but the artifact densities are different. The west side had about twice the number of artifacts for two-thirds the excavated volume, suggesting that the east side test pits were nearing the edge of the subsurface deposit.

The nonlocal materials of obsidian and Alibates chert as would be expected are less numerous. Little can be said about a single flake of Alibates chert, except that it is present. The obsidian artifact morphology distribution reflects an expected pattern. Obsidian, because it comes from a distant source, was curated, therefore it would have been transported in a preform or finished state as tools or bifaces. Maintenance and further reduction of bifaces should result in progressively smaller debitage, lower angular and core flake counts, and higher biface flake counts. This expected trajectory is borne out by the 62 percent occurrence of obsidian biface flakes versus the 12 percent occurrence of biface flakes of the local materials. Obsidian occurred in small numbers but probably represented an important addition to a tool kit because it is readily made into bifaces, has a sharp edge for cutting, and lends itself to repeated modification.

Other aspects of the local and nonlocal assemblages should be different if the materials were part of different procurement, transport, and use strategies. The occurrence of cortex should be higher on the local materials since it has a lower transport cost and would not need all waste material removed before transport. None of the nonlocal material has dorsal cortex remaining. Only 20 percent of the local material has dorsal cortex remaining. Nonlocal material was highly reduced, but the local material was also brought to the site in a reduced form, even though the distance to source was short (Table 4).

Artifact size should also decrease with distance from source because as a tool or core was reworked, it would get smaller. Therefore, all the debitage should be substantially smaller for nonlocal materials as compared with local materials. A one-way analysis of variance (ANOVA) rejects the null hypothesis at the .05 significance level that the non-local and local artifacts are similar in size. The mean length, width, and thickness for obsidian debitage was significantly lower than for local chert, chalcedony, and miscellaneous materials, supporting the hypothesis that obsidian was brought to the site in a substantially reduced form. Table 5 shows the summary statistics used for the ANOVA test.

Differences between local and nonlocal material uses are also suggested by the distal terminations of core and biface flakes. Core flakes were most commonly removed using hard hammer and soft hammer percussion (Crabtree 1972:8-17). These two methods combined with physical properties of the material and the thickness and strength of the striking platform result in a number of different flake distal terminations. Feather terminations occurred when the percussive force was successfully transmitted the full length of the flake. Hinge and step fractures occurred when the force was somehow impeded or excessive for the strength of the edge or striking platform. Late stage biface manufacture and edge resharpening required soft-hammer techniques on thin edges with small and weak striking platforms. The use of a single method may result in less variability in the flake terminations, while a wider range of core reduction and tool manufacture and maintenance should result in a more varied distribution of flake terminations. Table 6 shows that the nonlocal materials are almost bimodally distributed between feather and step fractures, while the local materials show a wider variety of terminations. These distributions are consistent with the expectations for manufacturing techniques used for local and nonlocal materials.

Table 4. Local and Nonlocal Material by Dorsal Cortex

Material Source	Dorsal Cortex			Row Total
	0	10-50%	51-100%	
Local	301 81.6% 91.2%	40 10.8% 100.0%	28 7.6% 100.0%	369 100.0% 92.7%
Non-local	29 100.0% 8.8%			29 100.0% 7.3%
Column Total	330 82.9% 100.0%	40 10.1% 100.0%	28 7.0% 100.0%	398 100.0% 100.0%

Table 5. Dimension Summary Statistics by Material Type

	LENGTH				WIDTH				THICKNESS			
	n=	Mean	Std Dev	Var	n=	Mean	Std Dev	Var	n=	Mean	Std Dev	Var
Material												
Chert	44	23.3	18.5	341.6	44	20.3	16.1	258.5	44	6.8	10.2	105.0
Chalcedony	290	15.6	10.7	114.2	290	13.6	8.2	67.25	290	4.2	4.9	24.46
Obsidian	29	10.6	4.2	17.82	29	9.2	2.9	8.599	29	1.6	.9	.828
Misc.	35	18.7	14.2	200.4	35	16.0	10.3	107.0	35	4.5	3.1	9.785

Table 6. Local and Nonlocal Core and Biface Flakes by Distal Termination

Count Row Pct Col Pct	Feather	Hinge	Step	Absent/snap	Obscured/natural	Broken manu.	Row Total
Local	84 39.4 86.6	45 21.1 100.0	68 31.9 86.1	3 1.4 100.0	12 5.6 100.0	1 .5 100.0	213 89.9
Non-local	13 54.2 13.4		11 45.8 13.9				24 10.1
Column Total	97 40.9	45 19.0	79 33.3	3 1.3	12 5.1	1 .4	237 100.0

These three indices of material procurement and tool manufacture and maintenance suggest that nonlocal materials were used for more restricted purposes than local materials. Non-local materials were brought to the site in a heavily reduced, small form with reduction or maintenance performed on curated preforms or finished tools. Local materials were also used in this manner, but they also may have been used to produce a wider range of tools, some for curated use at a more distant location and some for more immediate or expedient use.

Expected differences in the occurrence of nonlocal and local material debitage, and inferred core reduction, tool production, and maintenance strategies are suggested by this assemblage. Because the bulk of the assemblage is local, the distribution of local material attributes are analyzed by the arbitrary excavated levels to look for differences between and within test pits that might suggest changes in site activities. For this analysis, Test Pits 1 and 3 and Test Pits 2 and 4 are combined into analytical units in order to increase sample sizes and the power of the analysis.

Local raw material procurement patterns are indicated by percentage of dorsal cortex. Table 7 shows that noncortical artifacts are the most common, making up more than 70 percent of all provenience assemblages except in the west side Level 7 and east side Level 3. Only from the east side Level 3 is the increase in the early stage cortex percentages of 60 to 100 percent. This may be very tentative evidence of material being brought to the site as unreduced cobbles. The dominant pattern is that raw material was brought to the site in a substantially reduced form, with most of the cortex removed prior to transport. This pattern persists across the site and through stratigraphic time.

Table 8 shows the frequency distribution for angular debris, core flakes, and biface flakes by level. For most of the provenience units, core flakes are the most numerous, followed by angular debris, then biface flakes. On the east side in Levels 1 and 5, angular debris is more common than core flakes. In Level 2 biface flakes and angular debris occur in equal frequency. These are very slight differences that may be only a reflection of small sample size. Basically, core reduction was at a stage where only small amounts of angular debris were produced but not so advanced that bifacial tools or cores were the primary product.

As shown in the comparison of local and nonlocal materials, the nonlocal material tends to be very small pieces of debitage. Artifacts of local material tend to be small as well, but include larger core flakes, cores, and tools or preforms. Table 9 shows the distribution, by material type, of artifact types longer than 39 mm. Table 10 shows the distribution of artifacts longer than 39 mm by provenience and level. In other words, (a) the local material was brought to the site in a substantially reduced state, (b) the material was recycled resulting in progressively smaller waste products, or (c) the larger flakes were produced for use at a different site.

Flake portion is a measure of successful flake removal, which is conditioned by material quality, the manufacture stage, and the skill of the knapper. The latter is difficult to measure. The former is informative if obvious differences in material are present, such as the difference between obsidian and quartzite. This is not an aspect of this assemblage. Therefore, for this assemblage manufacture stage can be measured. Basically, early stage manufacture should result in more angular debris and broken flakes, as more force is imparted to a larger surface area while trying to remove cortex or unsuitable material. This would be an indication of quarrying. As the material gets smaller and the platform edge less resilient, less force is used. This should result

Table 7. Dorsal Cortex by Provenience for All Artifacts

Count Column Pct Row Pct	LEVEL1									Row Total
	0	1	2	3	4	5	6	7	8	
Surface										
0	42 79.2% 100.0%									42 79.2% 100.0%
10-50%	6 11.3% 100.0%									6 11.3% 100.0%
60-100%	5 9.4% 100.0%									5 9.4% 100.0%
Column Total	53 100.0% 100.0%									53 100.0% 100.0%
West Side										
0	4 100.0% 2.2%	70 86.4% 38.9%	29 82.9% 16.1%	15 83.3% 8.3%	23 79.3% 12.8%	18 81.8% 10.0%	12 70.6% 6.7%	8 66.7% 4.4%	1 100.0% .6%	180 82.2% 100.0%
10-50%		7 8.6% 29.2%	5 14.3% 20.8%	1 5.6% 4.2%	3 10.3% 12.5%		4 23.5% 16.7%	4 33.3% 16.7%		24 11.0% 100.0%
60-100%		4 4.9% 26.7%	1 2.9% 6.7%	2 11.1% 13.3%	3 10.3% 20.0%	4 18.2% 26.7%	1 5.9% 6.7%			15 6.8% 100.0%
Column Total	4 1.8% 100.0%	81 37.0% 100.0%	35 16.0% 100.0%	18 8.2% 100.0%	29 13.2% 100.0%	22 10.0% 100.0%	17 7.8% 100.0%	12 5.5% 100.0%	1 .5% 100.0%	219 100.0% 100.0%
East Side										
0		4 80.0% 5.1%	14 82.4% 17.7%	20 66.7% 25.3%	15 93.8% 19.0%	10 90.9% 12.7%	5 83.3% 6.3%	8 100.0% 10.1%	3 75.0% 3.8%	79 81.4% 100.0%
10-50%		1 20.0% 10.0%	3 17.6% 30.0%	3 10.0% 30.0%	1 6.3% 10.0%		1 16.7% 10.0%		1 25.0% 10.0%	10 10.3% 100.0%
60-100%				7 23.3% 87.5%		1 9.1% 12.5%				8 8.2% 100.0%
Column Total		5 5.2% 100.0%	17 17.5% 100.0%	30 30.9% 100.0%	16 16.5% 100.0%	11 11.3% 100.0%	6 6.2% 100.0%	8 8.2% 100.0%	4 4.1% 100.0%	97 100.0% 100.0%
Grand Total	57 100.0% 15.4%	86 100.0% 23.3%	52 100.0% 14.1%	48 100.0% 13.0%	45 100.0% 12.2%	33 100.0% 8.9%	23 100.0% 6.2%	20 100.0% 5.4%	5 100.0% 1.4%	369 100.0% 100.0%

Table 8. Angular Debris, Core Flake and Biface Flake Distribution

Count Col Pct Row Pct	LEVEL 0	1	2	3	4	5	6	7	8	Row
Surface										
Angular debris	12 24.0% 100.0%									12 24.0% 100.0%
Core flake	33 66.0% 100.0%									33 66.0% 100.0%
Biface flake	5 10.0% 100.0%									5 10.0% 100.0%
Column Total	50 100.0% 100.0%									50 100.0% 100.0%
West Side										
Angular debris		21 28.8% 35.0%	9 31.0% 15.0%	4 22.2% 6.7%	7 25.0% 11.7%	6 27.3% 10.0%	8 47.1% 13.3%	4 33.3% 6.7%	1 100.0% 1.7%	60 29.4% 100.0%
Core flake	3 75.0% 2.5%	40 54.8% 33.9%	15 51.7% 12.7%	14 77.8% 11.9%	16 57.1% 13.6%	14 63.6% 11.9%	9 52.9% 7.6%	7 58.3% 5.9%		118 57.8% 100.0%
Biface flake	1 25.0% 3.8%	12 16.4% 46.2%	5 17.2% 19.2%		5 17.9% 19.2%	2 9.1% 7.7%		1 8.3% 3.8%		26 12.7% 100.0%
Column Total	4 2.0% 100.0%	73 35.8% 100.0%	29 14.2% 100.0%	18 8.8% 100.0%	28 13.7% 100.0%	22 10.8% 100.0%	17 8.3% 100.0%	12 5.9% 100.0%	1 .5% 100.0%	204 100.0% 100.0%
East Side										
Angular debris		2 50.0% 7.7%	4 23.5% 15.4%	6 20.0% 23.1%	4 26.7% 15.4%	5 45.5% 19.2%	2 33.3% 7.7%	2 25.0% 7.7%	1 25.0% 3.8%	26 27.4% 100.0%
Core flake		1 25.0% 1.8%	9 52.9% 16.1%	21 70.0% 37.5%	9 60.0% 16.1%	4 36.4% 7.1%	4 66.7% 7.1%	5 62.5% 8.9%	3 75.0% 5.4%	56 58.9% 100.0%
Biface flake		1 25.0% 7.7%	4 23.5% 30.8%	3 10.0% 23.1%	2 13.3% 15.4%	2 18.2% 15.4%		1 12.5% 7.7%		13 13.7% 100.0%
Column Total		4 4.2% 100.0%	17 17.9% 100.0%	30 31.6% 100.0%	15 15.8% 100.0%	11 11.6% 100.0%	6 6.3% 100.0%	8 8.4% 100.0%	4 4.2% 100.0%	95 100.0% 100.0%
Grand Total	54 100.0% 15.5%	77 100.0% 22.1%	46 100.0% 13.2%	48 100.0% 13.8%	43 100.0% 12.3%	33 100.0% 9.5%	23 100.0% 6.6%	20 100.0% 5.7%	5 100.0% 1.4%	349 100.0% 100.0%

in more consistent and successful flake removal, all things being equal. Table 11 shows that all proveniences have 70 percent or more whole flakes, suggesting a high success rate, and therefore indicates a later stage of core reduction or tool production. This measure supports other observations made about artifact size and dorsal cortex and their relationship to stage of manufacture.

Core reduction and biface production are indicated by the debitage types. Curiously, these activities are mostly represented by manufacture debris and not discarded cores and tools. Cores, tools and tool preforms account for only eight artifacts.

One core is unidirectional and three are bidirectional. The unidirectional core is from a cobble that was split in half with the resulting smooth surface used as a platform. This would be a logical core type when the raw material source was cobbles. The flake scars are 30 to 35 mm long, indicating that medium size flakes were suitable for the intended task. The bidirectional cores are about the same size as the unidirectional core, again suggesting that medium-sized flakes were acceptable products. Multidirectional cores, because they do not show a planned form, are usually associated with flake production or expedient tool production.

A middle stage biface is of local chalcedony. It measures 80 mm long by 56 mm wide by 18 mm thick. It is leaf shaped, with a sinuous cross-section. Three of the major flake scars terminate in radical hinge fractures that may have impeded further reduction and led to its discard. This middle stage biface is analogous to general purpose bifaces described by Kelly (1988:719-720). The biface could be used as a core, producing flakes as needed, or it could have been further reduced (except for the hinge fractures) into a bifacial tool or projectile. This artifact is also analogous to Binford's concept of "personal gear," highly curated, multipurpose tools that would be part of a forager's tool assemblage (1983b:276-278).

The two other facially modified artifacts are tool fragments. The late stage biface fragment is too small for a functional identification, although the triangular cross-section suggests that it might be a drill fragment. The middle stage uniface is also very fragmentary, but the edge shows use wear. Perhaps it is one edge of a multipurpose tool.

Tool use is indicated by three core flakes and the middle stage uniface that display use wear or edge modification. Two of the edges exhibited unidirectional wear patterns most often associated with scraping of hard materials. The other two exhibited unidirectional retouch modifying an edge probably for scraping. The edge angles of these tools range between 30 and 40 degrees and were most suitable for scraping of soft to hard, but not rough or uneven, surfaces. These tools are best characterized as expedient and would be expected in conjunction with plant and perhaps hide processing.

Ground Stone Artifact

A single mano fragment was recovered from surface strip in Test Pit 1 on the west side of the road. It is probably one-third of a one hand mano made from fine-grained indurated sandstone. The fragment measures 50 mm long by 99 mm wide by 46 mm thick. It has a bi-plano/convex cross section with an oval plan view. Both sides have ground facies. One side is

Table 10. Artifacts Lengths Greater than 39 mm by Provenience

Count Row Pct Col Pct	Level							Row Total
	0	1	2	3	4	6	7	
Surface .00	11 100.0 100.0							11 52.4
West Side 1.00		2 33.3 66.7	2 33.3 100.0	1 16.7 100.0	1 16.7 50.0			6 28.6
East Side 2.00		1 25.0 33.3			1 25.0 50.0	1 25.0 100.0	1 25.0 100.0	4 19.0
Column Total	11 52.4	3 14.3	2 9.5	1 4.8	2 9.5	1 4.8	1 4.8	21 100.0

Table 9. Local Material Types and Artifact Morphology with Lengths Greater than 39 mm

Count Row Pct Col Pct	ARTIFACT MORPHOLOGY						Row Total
	Angular debris	Core flake	Unidirectional core	Bidirectional core	Cobble tool	Middle stage biface	
Chert	2 25.0 66.7	3 37.5 27.3		2 25.0 66.7	1 12.5 100.0		8 40.0
Chalcedony	1 11.1 33.3	5 55.6 45.5	1 11.1 100.0	1 11.1 33.3		1 11.1 100.0	9 45.0
Miscellaneous		3 100.0 27.3					3 15.0
Column Total	3 15.0	11 55.0	1 5.0	3 15.0	1 5.0	1 5.0	20 100.0

Table 11. Local Material Flake Portions by Provenience

	LEVEL									Row Total
	0	1	2	3	4	5	6	7	8	
Surface										
Whole	33 86.8% 100.0%									33 86.8% 100.0%
Medial	1 2.6% 100.0%									1 2.6% 100.0%
Distal	4 10.5% 100.0%									4 10.5% 100.0%
Column Total	38 100.0% 100.0%									38 100.0% 100.0%
West Side										
Whole	3 75.0% 2.4%	40 75.5% 32.0%	17 85.0% 13.6%	14 100.0% 11.2%	18 81.8% 14.4%	14 82.4% 11.2%	10 90.9% 8.0%	9 100.0% 7.2%		125 83.3% 100.0%
Proximal		2 3.8% 100.0%								2 1.3% 100.0%
Medial		1 1.9% 33.3%	2 10.0% 66.7%							3 2.0% 100.0%
Distal	1 25.0% 9.1%	2 3.8% 18.2%			4 18.2% 36.4%	3 17.6% 27.3%	1 9.1% 9.1%			11 7.3% 100.0%
Lateral		8 15.1% 88.9%	1 5.0% 11.1%							9 6.0% 100.0%
Column Total	4 2.7% 100.0%	53 35.3% 100.0%	20 13.3% 100.0%	14 9.3% 100.0%	22 14.7% 100.0%	17 11.3% 100.0%	11 7.3% 100.0%	9 6.0% 100.0%		150 100.0% 100.0%
East Side										
Whole		2 100.0% 3.0%	10 76.9% 15.2%	23 85.2% 34.8%	11 78.6% 16.7%	5 71.4% 7.6%	4 80.0% 6.1%	7 87.5% 10.6%	4 100.0% 6.1%	66 82.5% 100.0%
Medial				1 3.7% 100.0%						1 1.3% 100.0%
Distal			3 23.1% 23.1%	3 11.1% 23.1%	3 21.4% 23.1%	2 28.6% 15.4%	1 20.0% 7.7%	1 12.5% 7.7%		13 16.3% 100.0%
Column Total		2 2.5% 100.0%	13 16.3% 100.0%	27 33.8% 100.0%	14 17.5% 100.0%	7 8.8% 100.0%	5 6.3% 100.0%	8 10.0% 100.0%	4 5.0% 100.0%	80 100.0% 100.0%
Grand Total	42 100.0% 15.7%	55 100.0% 20.5%	33 100.0% 12.3%	41 100.0% 15.3%	36 100.0% 13.4%	24 100.0% 9.0%	16 100.0% 6.0%	17 100.0% 6.3%	4 100.0% 1.5%	268 100.0% 100.0%

ground very smooth and flat. The other side has been pecked which, has roughened a previously ground flat to slightly convex surface. The two surface textures suggest that each face was used at a different stage of grinding, such as for coarse and medium grained meal. Striae on both surfaces are transverse to the long axis of the mano. The almost flat grinding surface resulted from use with a slab metate.

Ceramic Artifacts

Six sherds were recovered from Test Pit 3. They all date to the Historic period, roughly between A.D. 1760 and 1900. These are types that would have been part of the domestic assemblage of Native American or Hispanic families.

Two sherds were recovered from Level 3, 20-30 cm below the modern ground surface. One is from a jar body of a micaceous paste utility pot. The abundant mica is part of the clay body rather than an additive. Both surfaces were scraped and smoothed. The sherd is 4 mm thick. This sherd is typical of utility wares that were widespread throughout the Rio Grande Valley and northern New Mexico. Its origins are usually attributed to the Picuris/Taos area, although it was probably made over a larger area. The other sherd is from a jar body of Tewa plain ware. It has a very fine grained paste with finely crushed crystalline tuff temper. The surfaces are scraped and smoothed. Like the micaceous utility pottery, Tewa wares were widely distributed and made throughout the Middle and Lower Northern Rio Grande.

Two sherds were recovered from Level 4, 31-40 cm below the modern ground surface. Both sherds are from jar bodies of micaceous paste utility ware as described above. They are 4 mm and 9 mm thick, illustrating the wide range in body thickness that is typical of the micaceous paste utility wares.

Two sherds were recovered from Level 5, 41-50 cm below the modern ground surface. One sherd is a very small fragment of a Powhoge Polychrome jar body. It has very fine-grained paste with mica and quartz. The exterior is polished over an off-white, crackled slip. The interior is sooted. Powhoge Polychrome dates between 1760 and the early 1900s. The other is a jar body sherd of micaceous paste utility ware as previously described. It is 2 mm thick which is similar to Ocate Micaceous, a Jicarilla Apache ware that dates between A.D. 1550 and 1750 (Gunnerson 1969:26-27). Ocate Micaceous is scored on the exterior but this sherd is smoothed.

The ceramics date between 1760 and 1900 and are the most common types for the period. They were common items owned by all groups living in Northern New Mexico at the time. Therefore, their presence cannot be attributed to a particular group.

Historic Artifacts

A total of 19 historic artifacts were recovered from Test Pits 3 and 4. These artifacts are typical of domestic and road refuse. The proximity of LA 84318 to an early twentieth-century homestead and to El Cerrito may account for their presence. These artifacts have manufacturing

Table 12. Distribution and Frequency of Historic Artifacts by Level

Level	2	3	4	5	6	Total
Test Pit 3						
Tin can fragments		3		2		5
Sheet metal scrap			1			1
Common nail				2		2
Shoe leather			4			4
Window glass			3			3
Brown bottle glass			1			1
Subtotal		3	9	4		16
Test Pit 4						
Clear bottle glass	1					1
Aqua bottle glass			1			1
Window glass					1	1
Subtotal						3
Grand total	1	3	10	4	1	19

dates that range between A.D. 1880 and the present. Their presence in subsurface deposits to 60 cm below the modern ground surface indicates that upper soil levels have been churned. Rodent burrows were noted in Test Pit 4, which could account for the small glass fragments. No rodent disturbance was noted for Test Pit 3 although some plowing of the floodplain probably occurred. Table 12 shows the distribution and frequency of historic artifacts.

Faunal Remains

Six fragments of animal bone were recovered from Test Pits 3 and 4. Test Pit 3, Level 2 (10-20 cm) had three fragments and Level 3 (20-30 cm) had two fragments. Test Pit 4, Level 4 (30-40 cm) had one fragment. All six fragments are from small- to medium-sized mammal long bones. Whether the remains are from domesticated or wild species could not be determined.

Summary

The test excavations yielded stratigraphic and artifact information from prehistoric and historic periods. The stratigraphic information can be used to evaluate the condition of the deposits. The lithic artifact data, which are treated as primarily a prehistoric manifestation, provide information that can be used to describe lithic material procurement and reduction patterns. These prehistoric artifact patterns can then be interpreted from the perspective of local and regional culture history.

Site stratigraphy was divided into four soil levels. Stratum 1 is the loose modern eolian sandy loam that covers the site area and contains a mixture of historic and prehistoric artifacts. Stratum 2 is a more compacted continuation of Stratum 1 with more gravel and less organic material. Historic and prehistoric artifacts are mixed, with the most and largest historic artifacts occurring in Level 4 of Test Pit 3, between 30 and 40 cm below the modern ground surface. The size and quantity of the artifacts suggests that this may be the bottom of the historic/prehistoric mixed fill. Stratum 3 is similar to Stratum 2, but with a more reddish brown soil. There is an increase in caliche, which sometimes coats the lithic artifacts, and the historic artifact numbers dwindle. The caliche coating on the lithic artifacts may be an indication of their relative depositional age. Artifacts without caliche have not been in the soil long enough to acquire a patina, so that patinated artifacts may be older. Stratum 4, only found on the east side of the road, was a sandy fill that may be redeposited or it may be a less consolidated version of Stratum 2. Like the other strata it had a low frequency distribution of lithic artifacts.

The mix of historic and prehistoric artifacts in Stratum 2 may partly be caused by plowing in the floodplain. Plowing can bring up artifacts from previously undisturbed deposits and create a mix with little spatial integrity (Schiffer 1987:131). The associations between large and small size artifacts and vertical locations change as a result of plowing. Large artifacts have greater upward and horizontal movement while the lower levels of the plow zone will accumulate more small debris as large artifacts move upward and smaller artifacts filter downward. The associations between large and small artifacts also change as large artifacts move horizontally across the site (Schiffer 1987:131). Plowing may affect artifact distributions to a depth of 30 cm. In a floodplain, like the Pecos River, periodic flooding might deposit or remove soil resulting in a vertically moving plow zone. Historic artifacts recovered from 40 to 50 cm below the surface from LA 84318 may be evidence of a fluctuating plow zone.

Plowing may have changed the structure of the archaeological record. The two major stratigraphic divisions are a recognition of this possibility. At present the analytical units have not been condensed into these two groups. Instead, comparisons between road sides by vertical units were made using arbitrary 10 cm levels, recognizing that spatial information relating to the prehistoric occupation may still be retained within the plow zone.

The lithic artifact assemblage was produced mainly from local material. The nonlocal materials, obsidian and Alibates chert, and local materials exhibited different patterns with regard to procurement and reduction. The nonlocal assemblage had no dorsal cortex, more biface flakes than core flakes, very low frequency of angular debris, and the mean artifact size was significantly smaller than local material artifacts. The local assemblage consistently had more core flakes than biface flakes, and fluctuating amounts of biface flakes and angular debris. These two patterns suggest that local and nonlocal materials arrived at the site in different forms, were used for different purposes, and perhaps represent different aspects of a cultural system (Binford 1983c).

Nonlocal material is never abundant but it persists throughout all levels on the east side of the road, and in all but Levels 3 and 8 on the west side of the road. Obsidian may have been highly curated as part of personal gear (Binford 1983b:276-278). It may have been transported as bifacial tools or cores that could be readily modified to suit an immediate need or easily maintained when an edge or tip was dulled or broken in use. Because obsidian is nonlocal and is well suited to biface manufacture, it may have been recycled through time as one person's discarded biface became another person's scraper or knife. However, as personal gear, obsidian tools rarely would have been discarded away from the residence or base camp (Binford 1983b:276-278).

Local material procurement patterns were inferred from dorsal cortex and artifact size. A combination of low percentage of dorsal cortex and small artifact size for all proveniences was used to infer that material was brought to the site in a reduced form, with cortical exteriors and poor quality material removed prior to transport. This was done even though the local raw material source occurs in the gravel on the canyon rims above the site, less than 2 km distant. Furthermore, recycling was offered as a possible factor in determining small artifact size. On-site recycling of material cannot be easily measured or detected unless core refitting is a feasible analysis technique. As well as on-site recycling, use of partly reduced materials scavenged from raw material locations may have occurred. Therefore, the procurer either would not have reduced or only minimally reduced the material prior to transport. Unquantifiable factors may influence artifact size and apparent procurement patterns at the local level. This pattern of local raw material procurement persists in all proveniences with only minor fluctuations suggesting a different pattern.

Local material frequencies of core, biface flakes, and angular debris are used as indicators of core reduction and tool production. The local material debitage composition indicates that core reduction was the primary activity resulting in durable discarded items. Tool production and maintenance of general and specific use tools occurred. Core flakes are always the most abundant discard. The small size of the core flakes suggests that larger flakes, if they were produced, were transported for use at another site.

The small number of artifacts that show use wear is slim evidence from which to infer the level of tool use and associated activities on the site. Binford (1983c:262-264) illustrates that in logistical strategies only a very small percentage of gear and supplies remain in the archaeological record for more than a short time. Curated items, like personal gear, were rarely left behind. Discard of durable items like stone tools would result from obsolescence caused by breakage.

The historic artifacts, including Pueblo ceramics, and metal, leather, and glass fragments, provide little information about historic period land use. The Pueblo ceramics have manufacture dates that range between A.D. 1760 and 1900. They could have been part of a domestic assemblage from any group that lived along the Pecos River during that period. The other historic artifacts date between 1880 and the present and may be redeposited sheet wash from the Quintana homestead or they are road trash. The low number of historical artifacts shows that the north side of the Pecos River was not an important dumping area for El Cerrito residents.

In order to discuss the site in the context of local or regional culture history, temporal data are needed. Except for the historic period Pueblo ceramics and Euro-American artifacts, no datable artifacts were recovered. As discussed in the Culture History section, the El Cerrito area shows evidence of occupation from 5500 B.C. to the early 1800s by Native American populations. That LA 84318 was a multiple occupation site is no great surprise, but the problem is who occupied it and when. Without datable material we are afloat in the cultural-historical sea without a sail or paddle.

It may be tempting to interpret the absence of prehistoric ceramics as an indication that the site was occupied by nonsedentary hunter-gatherers. However, hunting and gathering as a subsistence strategy may have persisted well into the Historic period. It is widely accepted that Archaic period people depended almost completely on hunting and gathering for subsistence. In northeast New Mexico, a hunting and gathering strategy may have been dominant as late as A.D. 1000, and as Mobley suggests (1979), hunting and gathering may have continued to be an important subsistence strategy into the 1300s. There is good evidence from the Jemez Mountains in New Mexico that Pueblo populations from A.D. 1200 to 1500 hunted and gathered in montane environments. The lithic artifact assemblages from Pueblo hunting and gathering are virtually indistinguishable from Archaic period assemblages unless diagnostic artifacts are also present (Acklen et al. 1990). Athapaskans, like the Jicarilla Apaches, who arrived in the early 1500s remained largely hunter-gatherers into the 1700s and probably relied on hunting and gathering into the 1880s. The lithic artifact descriptions from the Glasscock site, near Ocate, New Mexico, (Gunnerson 1969:27-28) indicate that the Jicarilla Apaches had a well-developed lithic technology especially geared toward hunting. However, the chipped stone debris has not been characterized to allow comparisons with assemblages lacking diagnostic artifacts. So sites that have only chipped stone debris from core reduction and tool manufacture and maintenance are not likely to be temporally diagnostic.

The historic artifacts shed little light on the problem of when El Cerrito was initially settled. The small number of artifacts suggest that initial settlement was not located within the right-of-way at LA 84318. Until a bridge was built across the Pecos River in 1916, the river was probably only crossed when necessary, and probably mostly for travel to Las Vegas or to ranch lands outside the village. Reasons for the small number of historic artifacts that might have come from the homestead occupation could include (a) the floodplain was cultivated and therefore not used for trash disposal; (b) trash was removed during road construction; or (c) the trash was hauled away from the house site.

RECOMMENDATIONS

Survey and recording of LA 84318 identified the site as a dispersed, surface ceramic and lithic artifact scatter. The excavation of four test pits revealed cultural deposits to a depth 80 cm below the modern ground surface within the proposed construction right-of-way. The upper 40 to 50 cm of the cultural deposit are disturbed as evidenced by a mix of late nineteenth- and twentieth-century Euro-American artifacts and chipped stone debris were recovered. The only datable artifacts (except for obsidian flakes) were recovered from the upper disturbed soil level. The lower 20 to 30 cm of cultural deposit exhibits bioturbation, but only chipped stone artifacts. The results of the testing indicate that LA 84318 has the potential to yield important information. No artifacts or features were found that were contemporary with the establishment of El Cerrito or directly associated with the 1916 homestead occupation, and it is unlikely that more will be found. The Euro-American materials have little data potential because of their low frequency and disturbed setting. Therefore, the data recovery efforts will focus on the pre-1846 Native American occupation. A data recovery plan is presented in the following section.

THE DATA RECOVERY PLAN

LA 84318 is a ceramic and lithic artifact scatter along the north bank of the Pecos River in the floodplain. The site is divided into east and west by County Road B27A. The existing roadway will be realigned to conform with new bridge construction. A small amount of new right-of-way will be required for the construction, and it is within the new right-of-way that the archaeological excavation will occur.

The test excavations revealed buried cultural deposits and two major soil divisions based on the presence of caliche and the type of disturbance. The surface and upper 30 to 50 cm of the buried deposits have been altered by road construction and floodplain cultivation and have little or no caliche in the soil. The lower deposits have caliche in the soil, which has become encrusted on artifact surfaces, and the soil has been altered by rodent burrows.

Artifacts are chipped stone in the form of core reduction and tool manufacture and maintenance debris. Four tools with modified or utilized edges, four cores, one middle stage biface, but no formal, whole tools, were recovered. Artifact density per 10 cm level ranges from 1 to 47 artifacts per sq m, with artifact densities highest in the upper levels and decreasing gradually with depth.

The deposition represents an accumulation that could come from 7,100 years of Native American use of the Pecos River canyon and surrounding environment. This span is based on the "dated" sites reported from surveys in the surrounding area. The datable artifacts from LA 84318 are Historic period Pueblo sherds.

Obvious natural resources in the immediate environment include water, fuel, shelter, the plant and animal resources available in the immediate riparian, canyon, and mesa-top environments, and lithic raw material for chipped stone and grinding implement manufacture. Depending on the Pecos River channel depth, the bottom lands may have been arable, although wider, and perhaps productive land is more abundant outside the El Cerrito area. Except for arable land, these resources would be exploited using a hunting and gathering strategy.

Research Orientation

A Hunter-Gatherer Model

By definition, Archaic period populations derived their subsistence mainly from hunting and gathering. Even with an increasing reliance on farming, ancestral and historic Pueblo populations depended on hunting for protein and gathering as a seasonal supplement. The hunting and gathering strategy employed would have been dictated by the environment, demography, and social and economic dynamics like trade alliances and marriage practices. Models have been presented for groups that rely mostly on hunting and gathering and trade for subsistence (Binford 1983a). The models have been applied to archaeological sites in an attempt to understand temporal and spatial variability in artifact patterns, and identified patterns have been applied to temporally nondiagnostic sites, especially in the San Juan Basin (Reher 1977; Moore 1980; Vierra 1980; Elyea and Hogan 1983).

Sites were classified as functional units indicative of different organizational elements of hunter-gatherer settlement and subsistence strategies (Binford 1983b; Moore 1989; Vierra 1980; Elyea and Hogan 1983). Site types most commonly defined were residential sites, base camps, field camps, and resource extraction locations. The frequency and distribution of different site types was determined by the subsistence strategy. Binford (1983a) proposed two major hunter-gatherer strategies--forager and collector.

Briefly, based on ethnographic studies, foraging strategies were employed to bring people to the resources that would be processed and consumed at a residential site. Resource extraction locations were distributed around the base camp within a round-trip distance that could be traveled in a day. This strategy would work best in an environment where most resources were evenly distributed across the landscape, with residential camp locations determined by the most critical resources like water. Residential camps were moved as resources were depleted or the camp became uninhabitable. With this strategy, many base camps would be scattered across the landscape. There would be few or no intermediate sites between the residential site and the resource extraction location (Binford 1983a:5-10).

Collecting strategies were employed to bring resources to people in a partly processed state for further processing, consumption, and storage. Residential camps would be located at or near critical resources, like water, fuel, and seasonally abundant plant and animal resources. Stays at residential camps would be longer than for foragers, with resource procurement occurring as a multistage process. The residential site might have structures and storage and production facilities. Resource extraction locations would be distributed within a one-day round trip from the residential site. More distant, but critical resources would be procured from temporary base camps that might have production, processing, and consumption facilities, but no food storage facilities or structures. Around the temporary base camps would be resource extraction locations. Long-range resource procurement would be supported by field storage or caches of raw materials and processing implements (Binford 1983a:10-12).

Ways to recognize different hunting and gathering strategies in the archaeological record have focused on site formation and settlement patterns and technological organization. Studies have provided propositions and patterns that should result from different procurement strategies. These propositions are offered as a way to describe and interpret variability in the archaeological record. Binford (1983c:268) cautions that no simple equations predict these relationships or how they will be distributed within the archaeological record. Some of the propositions from these studies are outlined in the following, with the idea that they may be applied to the excavation data from LA 84318.

Site Formation and Use

Testing suggests that LA 84318 is an accumulation of artifacts that formed over a long period as the result of occupation by any or all of the prehistoric and historic ethnic groups that at one time occupied or used the Pecos River Valley. As such, stratigraphic levels within the site cannot be interpreted as a record of discrete episodic events. The artifact assemblage and distribution are likely a mixed deposit resulting from changing subsistence strategies through time. Given this situation, the same tool or feature types were used, but within an organizationally different context.

Camilli's study of Basketmaker II sites in the Cedar Mesa area, southeastern Utah, addresses site structure and formation that results from reoccupation or reuse (1989). For logistically organized hunter-gatherers or people acting like hunter-gatherers, mobility leads to reoccupation of locations. Base camps and procurement locations may be reused. As seasons change or resource distribution varies, base camps may become procurement locations and vice-versa (Binford 1983d:361-366). The site structure and artifact patterning that result from multiple reoccupations may be complex and the overlapping and accumulative discard patterns may have no direct relationship to the behavior that formed them (Camilli 1989:18). However some properties of the structure of the artifact pattern can be suggested. These properties relate to site size, artifact frequency and density, and scatter size.

Site size, artifact frequency, and scatter size are best applied to studies where the total site area can be investigated. In the case of LA 84318 where only the site within the right-of-way can be studied, artifact density is appropriate.

Artifact density on a site that has been reused many times may reflect two different occupation patterns. First, it can reflect a multiple occupation defined as occupations resulting in overlapping distributions of features and artifacts resulting in increased site size and lower artifact frequencies. Second, a reoccupation is where facilities and space are reused within the same spatial limits (Camilli 1989:19). One measure is the artifact density per unit area (DPUA), which is simply the number of items divided by the spatial unit divided by the spatial unit again (Camilli 1989:21). If a single occupation site can be identified, then probable reuse sites can be compared against it.

Expectations. (1) Reoccupied sites should have a higher DPUA than single occupation sites because the artifact numbers increase without a concomitant increase in site size. (2) Multiple occupation sites have a lower DPUA than single and reoccupation sites because the artifact density remains constant, but the site size increases. This measure assumes that other factors influencing artifact density and site size are held relatively constant. For LA 84318, changes in artifact density may relate to multiple occupation or reoccupation providing some understanding of site formation.

Studies of Tools

The production of general-purpose bifaces coincides with a mobile subsistence strategy and settlement pattern. General-purpose bifaces were more commonly made at residential base camps than field camps or resource procurement sites (Kelly 1988). Therefore residential base camps should have more evidence of early or middle stage biface manufacture.

Kelly (1988:731) defined three types of bifaces: (1) those used as cores and tools; (2) long use-life tools, that can be resharpened; and (3) function-specific tools, determined by the tool shape. Each biface type would be curated, but under different conditions. Use of bifaces as cores would be conditioned by the quality and availability of raw material. When suitable raw material and tool-use locations coincide, an expedient flake technology would be expected, resulting in multidirectional or unidirectional cores and few bifacial cores (Kelly 1988:719). If local raw material is scarce or of poor quality, bifaces made from distant raw material sources would be designed to compensate for the distance between source and use location (Kelly 1988:719). If raw material was scarce, and access to better materials limited, then bifaces would be used as cores and they would be rejuvenated or resharpened frequently (Kelly 1988:720). Therefore tools used for long distance forays will be bifacial because the form will meet a variety of needs and tasks, planned or unexpected. Target-specific forays may require more function-specific tools, with less adaptability to other needs or tasks (Kelly 1988:721).

Kelly's (1988:721-723) model of biface and core reduction provides expectations for discard patterns at residential and logistical or field camp sites. The expectations are adapted from Moore (1989:21-23):

IA. The production and use of bifaces as cores in residential sites should result in:

1. a positive correlation between frequency of bifacial flaking debris, utilized biface flakes or biface fragments, and the total amount of lithic debris;

2. a high percentage of utilized biface flakes relative to unretouched flake tools;

3. a low incidence of simple percussion cores, especially unprepared or "casual cores"; and

4. evidence of "gearing up at quarries": a low incidence of cortical flakes and the use of high-quality raw material, perhaps obtained from a distant source.

Discussion: Expectation 1 implies that tools were used and produced at the same place, which is also an indication that suitable raw material was locally abundant. Abundant material would allow all stages of biface reduction. Expectations 2 and 3 assume that the bifacial core technology would be chosen over an expedient technology. However, it is just as likely that both expedient and biface technologies could occur under the conditions of abundant material and high task variability. Expectation 4 assumes that the residential site is not located at raw material source, and that initial stage core reduction and material testing would have been done prior to transport.

IB. The production of bifaces in residential sites, which are then used as cores in logistical sites, should result in:

1. a division of sites into two basic categories, one in which there is a high, and another in which there is a low incidence of utilized biface-reduction flakes, the former being logistical and the latter residential sites; bifacial tools would be produced and maintained in residential sites, whereas they would be used as tools or cores in logistical site;

2. likewise, residential sites should display a higher rate of increase (ie., a higher slope of a regression curve) than logistical sites between biface fragments and measures of the frequency of biface knapping as a function of tool maintenance and replacement; and

3. residential sites should contain a higher frequency of utilized simple flake tools as opposed to utilized flakes removed from a biface.

Discussion: Expectation 1 implies that in a logistical context, utilized biface flakes should be differentiated from rejuvenation flakes by the evidence of wear. In a residential setting, unutilized, utilized, and rejuvenation flakes would co-occur. Expectation 2 implies that evidence of tool manufacture and maintenance should be correlated at residential sites, while logistical sites should show no correlation. Expectation 3 assumes that expedient tool use would result from material abundance and diverse task requirements. Logistical site tool use requires more planning and adaptability to allow for edge or tool failure or unexpected needs.

II. The use of bifaces as long use-life tools should result in:

1. infrequent unifacial examples of the tool type (e.g., projectile points); these may be instances of expedient tool production;

2. a pattern of tool production in residential sites similar to III (below), with a high correlation between bifacial debris and tool fragments, but these fragments should show evidence of rejuvenation or resharpening;

3. evidence in logistical sites of the tool having been resharpened, resulting in a low rate of increase in biface fragments relative to biface flaking debris, as in IB.2, but with few of the biface reduction flakes having been utilized; and

4. possibly evidence of haft manufacture and maintenance in residential sites as in III.4 (below).

Discussion: Expectation 1 suggests that long-use tools are made for adaptability, unifacial tools are less versatile and therefore would not be expected on logistical sites. Expectation 2 recognizes that long use-life tools will be returned to the residential site for maintenance or discard. In a field context, they would not be discarded unless suitable material were available or all utility was lost. Expectation 3 emphasizes that in logistical situations long-use life tools are designed to be modified. The flakes that result from modification are not the object of production and therefore should not show use wear. Expectation 4 notes that notching flakes are the best evidence for haft manufacture and maintenance.

III. The manufacture of bifaces as a by-product of the shaping process should result in:

1. a concentration of bifacial-flaking debris in residential sites, especially very small bifacial-retouch flakes, and a positive correlation between biface fragments and bifacial flaking debris;

2. a low incidence of use of biface-reduction flakes as tools;

3. a relatively high incidence of unifacial instances of a normally bifacial tool type (contrast with II.1 above); and

4. an archaeological record at residential sites indicating the maintenance of hafted tools, e.g., flake tools, burins gravers, spokeshaves, and scrapers.

Discussion: All four expectations suggest that raw material was abundant and tools were made for specific not general purposes. These expectations would apply to residential or field locations where material was abundant.

This set of expectations for tool manufacture and use allows assemblage study from the perspective of raw material abundance, task requirements, and economic planning and organization. In an archaeological context containing little direct evidence of subsistence they can provide clues to subsistence organization and how a particular site or occupation may fit into a settlement pattern. LA 84318 may be a site with little direct evidence, but plenty of indirect evidence in the form of lithic artifacts.

Expedient and Curated Technologies

Based on ethnographic observation, Binford (1983c) proposed relationships between tools and their place of discard, manufacture debris and tools, and between different tool types in the context of expedient or curated technologies. Tools or gear may have different importance, and therefore receive different treatment with regard to production, use, maintenance, and discard, depending on the level of subsistence organization.

Expedient tool manufacture and use strategies are associated with organizational systems that do not have to plan because of abundant and evenly distributed resources. Binford characterizes expedient technologies as "...poorly organized technologies [that] tend toward the expedient manufacture, use, and abandonment of instrumental items in the immediate context of use" (1983c:264). Tool replacement rates are directly proportional to how many times a tool is used for an activity. Accordingly, the tool manufacture debris and the tools are associated, so that tool manufacture and use occur at the same location (Binford 1983c:264).

Curated strategies are associated with highly organized technologies where raw material for tools and hunting or collecting locations are not evenly distributed across a landscape. Accordingly, tool replacement rates are determined by a use-life that is lengthened by maintenance and care (Binford 1983c:264). Therefore, tools and the by-products of activities in which the tools were used should have no numerical correlation. Also tool manufacture debris should covary with broken or discarded tools and not with finished products, which would have been removed from the site.

Binford's proposed relationships between manufacture debris and tools and between different tool types under expedient and curated strategies may be evident in the archaeological record. The strength of the relationships will vary depending on other factors, like raw material availability and quality, technological skill, and type of resource procurement strategy (Binford 1983c:265-267). These propositions are similar to Kelly's model for biface manufacture and use, but they extend beyond bifacial tools and include other tool classes that can be classified under personal and situational gear and site furniture (Binford 1983b:276-280).

Expedient tool manufacture and use should result in two relationships that would be visible in an assemblage from an open air site: (1) there is an inverse relationship between the number of broken and worn out tools to new tools. Tools would be made as needed and discarded when used up. New tools for some anticipated task at a different location would not be made, and therefore would be absent or present in very low numbers; (2) tool frequency, regardless of condition, and the quantity of tool manufacture debris should be correlated. In other words, as the amount of manufacture debris increases, so should the number of tools, since under an expedient strategy, tools are used where they are made (Binford 1983c:265-266).

Curated strategies should result in two relationships that would be visible in an assemblage from an open air site: (1) Frequency of broken and worn-out tools should be proportional to one another. Tools under maintenance and care would be returned to the base camp or residence for discard. Most tool manufacture would occur at the base camp or residence. Therefore curated tools would usually be associated with manufacture location and not a use location; (2) Unused and unbroken tool to manufacture and broken tool frequencies should be inversely proportional. New tools would be carried to a field camp and returned to the base camp used or broken. Again manufacture would occur most often at the base camp or residence. A third relationship is more a statement of tool and debris relationships between sites of similar function. These relationships will vary between site types depending on group size, season, raw material availability, and procurement activity (Binford 1983c:265-267).

Research Implementation

The propositions presented by Camilli (1989), Kelly (1988), and Binford (1983c) provide avenues for interpreting an archaeological record that was generated by a mobile subsistence and settlement pattern of hunting and gathering populations. These propositions are best suited for interpreting a record derived from a known sample of a subsistence pattern from the same time period. However they can be useful for interpreting the artifact patterns present on a multiple reoccupation site like LA 84318.

The Regional and Local Prehistory section of this report demonstrated that hunting and gathering was an important subsistence strategy for Native American populations of the El Cerrito area and northeastern New Mexico at least until the Protohistoric period and probably later. The majority of the sites recorded in the area are temporally nondiagnostic lithic artifact scatters that were generally part of a hunting and gathering settlement pattern. This assumption is largely predicated on the absence of substantial architecture at sites in the El Cerrito area. Substantial architecture would be expected if a year-round agricultural subsistence system was being used. The formal tools from the sites recorded by Abel (1987, 1989a, 1989b, 1990) included manos, projectile points, bifaces, and utilized flakes, which are indicative of hunting and gathering. Very little pottery was recorded. Pottery in large quantities implies sedentism and a more permanent occupation associated with farming.

Occupation dates for the El Cerrito area sites and LA 84318 are very scarce. They are relative dates based on ceramic and projectile point typologies and temporal sequences. Given the potential for substantial reoccupation of sites over a long period, curated items like pottery and projectile points may have been recycled and the artifacts moved many times after their initial entry into the archaeological context (Schiffer 1987:4). Artifact dates may have nothing to do with actual occupation dates.

In terms of research questions for the LA 84318 data recovery program, certainly issues of site chronology and function are important. Their importance is conditioned by the reliability of the information and the condition of the archaeological context with regard to cultural and natural transformations (Schiffer 1987:10-11). Recycling and reuse, reoccupation and redeposition and mixing from plowing and road construction are examples of the former. Rodent disturbance and periodic flooding are examples of the latter. With this in mind, research questions that address site specific and local and regional problems can be asked.

Chronological Placement

1. **When was the site occupied?** This is an important question because of the long occupation sequence described for the El Cerrito area. Occupation could range from early Archaic period hunter-gatherers to later prehistoric farmers acting like hunter-gatherers to newcomer Athapaskans of the late Prehistoric and Early Historic period who traded with Pecos Pueblo and other eastern frontier villages. The testing data suggests persistence in the artifact pattern through stratigraphic time, so occupation date ranges will be necessary to better understand how LA 84318 fits into the regional and local chronology.

Date ranges are also necessary to address the rest of the research questions about economic organization and subsistence strategies. The quality of the study will depend on the fineness of the temporal resolution. Comparing late Archaic and Pueblo IV artifact patterns will be more interesting than comparing undated arbitrary levels.

How fine a resolution can be expected given the evidence for mixed and overlapping occupations? A hierarchy of dating methods and association can be suggested in response to the question.

Absolute dates are the most desirable because they are objective. Absolute dating methods include dendrochronology, archaeomagnetism, carbon-14, and obsidian hydration. Each of these methods has utility, limited by the quality and content of the archaeological deposits and the limits of their accuracy.

Dendrochronology may be the best method when reliable samples are available. Reliable samples should have 15 to 20 years of rings with attached inner or outer bark. The prospect of obtaining usable samples from LA 84318 is not bright. Dendro samples are best when collected from structural remains because their final context is known, although construction material reuse and stockpiling can cause inaccuracies (Graves 1983; Crown 1991). The unlikely occurrence of a dendro sample from a hearth context would be tempered by the same "old wood" problem that affects carbon-14 samples (Schiffer 1987:309-312). Dendrochronology is not considered a good prospect for LA 84318, but any sample with potential will be collected.

Archaeomagnetism does not have as fine a resolution as dendrochronology, but it does have other advantages because the samples are collected from a fixed context. Archaeomagnetic samples are collected from burned features or contexts with adequate iron content to allow polar calculations. Because the samples will come from spatially fixed features, they are not affected much by reoccupation, reuse or post-occupation disturbance. Therefore, the sample dates the last use of a feature and by association, the occupation level or surface. Problems with archaeomagnetism include obtaining a reliable polar curve for a particular period and area. The quality of the curve affects the accuracy of the date range. The polar plot may have from 1 to 4 degrees of standard error, which translates into about a 10-year per degree error. This is a good date range when compared with obsidian hydration and some carbon-14 results. However, the 4 degree radius may include two parts of the curve yielding dates from two unrelated periods. In this case, other dating methods are needed to determine which is the correct or best date (D. Wolfman, pers. comm., 1991).

Carbon-14 dating has more problems than the first two methods, but it has the advantage of abundant sample material in archaeological contexts. Charcoal is one of the most ubiquitous constituents of archaeological sites in the Southwest. The abundance is its advantage and downfall. Charcoal is subject to disturbance by post-occupation processes. Therefore, the integrity of potential samples may be suspect. One way to ameliorate the problem is to collect charcoal only from undisturbed feature contexts. If samples are collected from potentially disturbed contexts, then the resulting dates must be carefully assessed. The other problem with carbon-14 is the "old wood" issue previously mentioned for dendrochronology. Old wood may be in the systemic context for 200-300 years before it is burned as fuel. This results in an erroneous early date. The error rate is not a constant and therefore a more accurate date cannot be factored out. To lessen the "old wood" problem, the charcoal can be sorted by species and part. Small twigs or branches contribute less to the problem because they are recent growth and have shorter lives than dead wood. Annual plants are best because they are new every year and are not likely to survive a long time after dying. If sorting does not work, then a more general date should differentiate between Archaic and Pueblo periods. Transition period dates will be problematic (Schiffer 1987:308-312; Blinman 1990:12-15).

Obsidian hydration can be useful for dating but the error estimates tend to be large (200 to 400 years), which provides poor resolution. The quality of the hydration dates depends on the sample depth, the length of time it was subjected to corrosive processes, and the care with which samples are selected. Clearly, surface samples or samples that were on the surface for a long time are suspect, because of rime deterioration. The deeper the context, the better the chance for a "good" date. Care in samples selection is important because obsidian in certain situations may have a very long "use-life." Recycling and scavenging of artifacts at residential, base camp, and quarry sites may result in reworked edges or flake scars of very different ages. Each will have its own rime thickness and the average of an Archaic and Pueblo period date is really no date. Therefore for LA 84318, obsidian samples will be selected to provide the later date because the important use for dating occupation surfaces or levels will be the last use (Blinman 1990:10-11).

Indirect dates or associated dates may be derived from ceramics and temporally diagnostic lithic artifacts. Typologies for both artifact types are usually sufficient to provide a date within a 100 to 200-year period, except for the Archaic period. The problem with using sherds and projectile points as temporal markers is that they may have long use-lives and they are susceptible to cultural and natural forces moving them within the archaeological and systemic contexts. A projectile point or sherd may be picked up and used several times before finally entering the archaeological context. For this reason single artifacts from a period will not be considered as good temporal markers. More than two projectile points or lithic artifacts from a particular tool complex will be necessary to assign a date. Ceramics of more than one type or vessel form in close association and from similar periods will be acceptable for temporal assignment.

Datable material and samples will be obtained but will be scrutinized and evaluated in terms of spatial integrity, origin, and number. In this way dates will not be indiscriminately assigned, leading to erroneous interpretations.

Subsistence

2. Does LA 84318 reflect a hunting and gathering subsistence pattern and did the subsistence pattern change through time? This research question begins with the assumption that LA 84318 was not occupied for farming. This assumption is supported by the lack of structures, well-defined middens with pottery, and the likelihood that the occupation would not be located within the arable area. LA 84318 and most of the other recorded sites in the El Cerrito area do have artifact assemblages that include projectile points, early to late stage bifaces, manos, utilized flakes, and tool production and maintenance debris that are indicative of hunting and gathering, when the other elements of site structure are absent.

As indicated in the Summary of Analysis Results, the artifact pattern present in the four test pits could have resulted from occupation spanning the early Archaic period to late prehistoric and early historic times. There is strong evidence that the hunting and gathering pattern persisted through time though the economic organization of the site occupants probably changed. This change may be studied in terms of the three sets of propositions and expectations outlined in the Research Orientation. The propositions are not laws, but provide a framework for indirectly understanding variability in subsistence strategies. Subsistence strategies are reflected in the organization of lithic technology as represented by core reduction and tool manufacture debris, tool maintenance and care, and tool discard, within and between site assemblages. The propositions assume that subsistence strategies are organized to efficiently exploit the temporal and spatial distribution of resources, that they are planned to meet immediate and anticipated needs, they reflect knowledge of the environment, and that they are responsive to unplanned situations that might arise. Of course the utility of the propositions rests on their applicability to the study site or area.

How did LA 84318 function within the subsistence pattern? This question requires that the site or occupation be interpreted in terms of function. As mentioned before, different hunting and gathering patterns (foragers and collectors) may have had different site types with somewhat distinctive artifact assemblages. Typically, these site types are called residential sites or base camps, field or temporary base camps, and special activity or resource procurement sites. Using the propositions as a guide, somewhat idealized and composite assemblage characteristics can be outlined. For LA 84318 these assemblage characteristics can be compared with the excavated assemblages from dated occupation or arbitrary levels.

Expectations

Foraging. A foraging strategy should result in two site types: residential site and resource extraction locations. The resource extraction location would be evidenced by expedient unifacial tools or simple flake tools, in the absence of manufacture debris or features. Exceptions would hold for quarries, where a large amount of debris would be produced, and exceptional sites like kill sites, but again low numbers of manufacture debris would be expected with a disproportionate number of discarded utilized flakes, unifacial tools, and broken projectile points. The residential site assemblage ideally would be dominated by an unplanned and expedient technology. There should be more used than new tools, as old tools are discarded and replaced. Evidence for the use of simple flake tools produced from simple unidirectional or multidirectional cores should be present. A direct positive relationship between manufacture debris and discarded tools and very limited evidence of biface manufacture and bifacial flake tools should exist. Reuse or reoccupation of residential sites would occur if the resource abundance and distribution was similar from year to year. These relationships are stated as general patterns with no estimates of frequency or percentage because comparable data to derive such estimates do not exist for northeast New Mexico.

Foraging may have been a common strategy used by prehistoric farmers acting like hunter-gatherers. Farmers have a well-established residence or base camp, where most tool manufacture and resource processing and consumption should have occurred. However, as forays required greater travel to the resource (due to resource depletion in the immediate area) then farmers as foragers might have acted as collectors. The El Cerrito area shows it greatest Puebloan occupation during the Coalition period. Population levels were still fairly low and resource depletion may not have been a serious problem. Archaeological evidence for Classic period use is limited to fieldhouses and artifact scatters. Perhaps, with population growth and concentration around Pecos Pueblo, resource depletion was a factor and the farmer-foragers became more organized collectors or hunters who exploited more distant but unpopulated environments, like the El Cerrito area.

Collecting. A collecting strategy was commonly employed by Archaic and Athabaskan groups (before they adopted agriculture) and farmer-foragers acting as collectors. Collector residential camps would show evidence of tool production, tool maintenance, and food consumption. Processing activities for foragers and collectors may be different, because depending on the distance to the resource, collectors would have processed foods in the field before transporting it residential site.

Evidence for reuse and reoccupation could be expected as collectors returned to residential camps that were near critical resources. Reuse would result in a higher DPUA and reoccupation would result in similar numbers of artifacts but at lower densities as the site area increased.

Planned or highly organized technologies could be inferred for prehistoric collectors. Planned technological and logistical organization would result in different artifact patterns for residential sites and temporary or field base camps.

Residential site artifact assemblages, according to Kelly's (1988) and Binford's (1983c) propositions, can be viewed in a number of different ways. Depending on the technological organization, many different artifact assemblages may have resulted. At residential sites where abundant raw material for tool manufacture was available a bifacial core technology would not be necessary. Bifacial cores would most likely be produced for use on long-distance hunting and gathering forays. This would result in low numbers of utilized bifacial core flakes, but a lot of manufacture debris from early and middle stage biface reduction, and simple utilized flakes, and probably unidirectional and multidirectional cores. Long use-life or curated tool use should show a high correlation between biface fragments and manufacture and maintenance debris. There also might be notching flakes from hafted tool manufacture and maintenance. The evidence for the production of bifacial cores and bifaces and their maintenance suggests a gearing up for long-distance forays to places where suitable raw material was absent. Therefore, this type of artifact pattern at LA 84318 would represent gearing up and not actual hunting or processing at the site.

Field camps would be occupied for shorter periods and be used to collect and process specific resources for transport to the residential site. Binford (1983c) and Kelly (1988) suggest that field camps would require planning and therefore tools for specific tasks, which could be modified for unanticipated tasks. Where field camp location and raw material abundance coincided, planned tool technology would not be as important because replacement tools could be made. Some evidence of biface maintenance or discard of used or broken tools would occur with more expedient flake tools. Field camps and residential sites might be very difficult to identify under these conditions. But if raw material were not suitable or available, then, depending on the tasks, utilized biface flakes (evidence of general purpose bifaces), broken or used up bifacial tools, and worn resharpening flakes would be expected. There should be little manufacture debris, no finished and unused tools, and early manufacture stage debris. Raw material is abundant near LA 84318, so the latter pattern would be an indication that the raw material was not suitable.

The data necessary to address the subsistence problem as outlined are lithic artifacts. The lithic artifacts will be analyzed following the lithic artifact analysis standards of the Office of Archaeological Studies. The analysis standard is based on the assumption that lithic artifact technology was a staged process and that evidence of tool manufacture and use will vary according to subsistence strategies, which have temporal and spatial variability in New Mexico. The analysis standards provide a framework for monitoring raw material procurement, core reduction, tool production and maintenance, and discard behavior. The attributes that may best reflect technology include artifact morphology and function, material type and texture, percentage of dorsal cortex for artifact portion, and length, width, thickness, and weight for all lithic artifact types. Additional attributes for core and biface flakes include platform type and termination; for tools, use-wear and edge angle.

The subsistence strategy study mainly focuses on expectations for artifact patterns generated by forager and collector subsistence strategies. Artifact patterns will be concentrated on because the testing provided no indication that elements of site structures remain, such as hearths, storage pits, undifferentiated pits, structures, and occupation surfaces. If evidence of features is found, then that evidence will be incorporated into the analysis and interpretation of the artifact patterns. Also, subsistence strategies will be investigated indirectly because testing yielded no direct evidence of procurement, processing, and consumption of food items. The floodplain setting combined with a potential lack of features that would act as ethnobotanical catchments bode poorly for preservation. If evidence of intact deposits with potential for ethnobotanical remains are encountered, samples will be collected and the information will be incorporated into the analysis.

Regional Settlements and Land Use

3. How does LA 84318 fit into the existing knowledge of settlement patterns and subsistence strategies at local and regional scales? How accurately LA 84318 can be placed into local and regional contexts will be determined by how well temporal and behavioral data coincide. The more "good dates" associated with artifact patterns having contextual integrity, the better the interpretation at local and regional scales will be. Few or poorly associated dates will only allow generalizations that will not add significantly to existing knowledge.

The local scale will be addressed by comparing artifact data from LA 84318 with sites recorded by Abel (1987, 1989a, 1989b, 1990). Each occupation assemblage from excavation levels at LA 84318 may be compared to lithic artifact data from survey recorded sites. Preliminary analysis suggests that the most common debitage pattern found at the recorded survey sites (15 out of 30 sites), also holds true for LA 84318. Briefly, this pattern reflects a mixed pattern of core reduction, probably for expedient tool use and the production of bifaces with long use-lives. This suggests preliminarily that these were collector residential sites or base camps, but with three sites located at a raw material source resulting in proportionately higher percentages of cortical debris. This preliminary pattern will be expanded upon with more excavation data from LA 84318 and a more detailed analysis and discussion.

Initial analysis used clustering and discriminant techniques for defining groups and identifying the variables that most strongly influenced group formation. Cluster analysis was used to segregate the sites into groups by percentages of primary, secondary, tertiary flakes, and angular debris. These groups were then analyzed with the discriminant factor analysis to determine which variables most influenced group membership. As would be expected, the cluster analysis and discriminant analysis groupings showed strong concordance. The excavation data can be added to this matrix and different occupation levels will be analyzed as a part of the known local settlement pattern.

Regional scale interpretations will be based on the overview provided in the Culture History section. As noted, Paleoindian to Late Developmental settlement data are very scarce for northeastern New Mexico, except for isolated or distant examples, like Glassow's Cimarron District, Campbell's Chaquaqua Plateau, or Wiseman's excavation at Sitio Creston. From A.D. 1000 to 1500, however, use of the area is better understood from excavations at Tecolote, Rowe, and Pecos pueblos. The small scale of the excavation at La 84318, combined with the large gaps in the existing data base makes it unlikely that significant contributions will be made. It may be possible to speculate on the importance of hunting and gathering forays to Puebloan subsistence from the patterns that derive from the LA 84318 excavations. As was suggested for Question 2, Pueblo hunting and gathering organization may have been multistaged and it may have changed through time.

EXCAVATION METHODS

1. Pre-excavation procedures will include written and photographic recording of the present site condition and setting, the relocation of the previously established site datum, the establishment of at least one more subdatum on the east side of the road and two subdatums on the west side of the road, and the relocation of the original 1 by 1 m test pits for the purpose of setting up a Cartesian grid system on both sides of the road.

2. Horizontal control will be maintained within 1 by 1 m grids. The grid system will be oriented north to south. Each side of the road will have an independent grid system. Each grid system will have a unique numbering system, with grid designations assigned to the northwest corner of the grid.

3. Excavation of the site will concentrate on exposing contiguous units until at least a 32 percent areal sample of the site with buried deposits within the right-of-way is excavated. The 32 percent is based on excavating two 4 by 4 m areas on each side of the road, for a total of 64 1 by 1 m units. Contiguous excavation areas are necessary to provide provenience data that can be used for the artifact density and artifact pattern analyses. The 4 by 4 m area is proposed because of limits imposed by the right-of-way width that does not include the existing road. The first two 4 by 4 m excavation areas should incorporate or be adjacent to the original test pits that yielded artifacts and are the basis for the stratigraphic divisions. Excavation efforts would be maximized by starting with known deposits.

The third and fourth excavation areas should be spatially separated from the first two. Location of the excavation areas will be determined by a series of systematically placed auger holes. Auger holes with cultural fill, unusual stratigraphy or an unusual density of artifacts will be selected for the excavation units. If nothing unusual is defined with auger holes, then the excavation units will be placed to yield the best areal coverage.

3. Vertical control will be maintained through absolute elevations. Each subdatum will be tied into an off-site datum that will be assigned an arbitrary elevation, like 5.0 m. All excavation and vertical provenience of artifacts, features, and site and feature profiles and plans will be calculated relative to the off-site elevation. Use of absolute elevation will allow the matching of excavation levels across the site for spatial and temporal analyses.

4. Excavation will be by hand, using standard archaeological hand tools. All fill will be screened, with the mesh size determined by the excavation context. Screen mesh no larger than ¼ inch will be used. All 1 by 1 m units will be excavated by the two natural strata defined in the test pits. Within these strata, 10 cm excavation levels will be used providing finer control of artifact locations. The 10 cm levels will allow comparisons between excavation units using DPUA and other area and volume measures. If other stratigraphic levels are defined they will be incorporated into the system, and also excavated in 10 cm levels, if possible.

As excavation proceeds, diagnostic and large artifacts or potential structural components of features will be mapped using the closest set point. Grids will be excavated in quarter sections, so that if an artifact is found in the screen it can be located by the grid quarter. Artifacts that are found in the fill within a grid quarter will be located with the excavated level as the depth. In situ items will be mapped in place with an absolute elevation assigned.

Excavation will continue until sterile soils are encountered. To insure that sterile levels have been reached within the excavation units, auger holes will be placed in the bottom of each 4 by 4 m unit at the four corners.

Excavation documentation will consist of field notes and grid forms compiled by the excavator. The forms will contain locational, dimensional, stratigraphic, and contextual information. General notes will be kept by the project director and site assistants outlining excavation strategy and rationale, field interpretations, and decisions.

5. Features were not found during the testing. This part of the excavation methods is presented in the unlikely event that features are encountered. Feature excavation will proceed by exposing the top of the feature and the area immediately surrounding it. The stain or soil change will be mapped and photographed (if appropriate). The feature will be excavated in cross-section in 10 cm levels, exposing the natural stratigraphy. In the unlikely event that large features are encountered, 20 cm levels may be used to speed up overburden removal. Exposed artifacts or components will be located as described above. Artifacts from each level will be bagged separately. The cross-section will be profiled and the soil levels described, using a Munsell Color Chart and standard geomorphological terms. The second half of the feature will be excavated in natural levels or 10 cm arbitrary levels. All of the fill from the second half will be fine screened. If a feature is larger than 50 cm in diameter and 50 cm deep but less than 1 m in diameter and 1 m deep, then one-half of the cross-section will be fine screened. Larger features will have lower levels fine screened. Fine screening is a good way to obtain primary depositional information, recover botanical remains, and very small artifacts that normally slip through ¼-inch mesh.

Once the feature is completely excavated, feature maps and profiles will be drawn and tied into the grid system and absolute elevations. Drawings will include a scale, north arrow, and key to abbreviations and symbols. Written description will be done on standard forms that will include provenience, dimensional, soil matrix, artifact, construction, temporal, excavation technique, and other data. Photographs will record the feature excavation progress and the final excavated form. Photographs will include a metric scale, north arrow and mug board with the LA and feature number, and date. All photographs will be recorded on a photo data sheet.

Artifacts recovered from each provenience will be bagged and labeled by unit, stratigraphic or arbitrary level, date, and excavator's name. A specimen number will be assigned to all bags by provenience and a running field artifact catalogue maintained. Materials necessary for immediate preservation of fragmentary and unstable faunal and ethnobotanical remains will be used. Large lithic artifacts will be bagged separately to minimize bag wear. Very small flakes and angular debris will be placed in a vial or bag within the artifact bag, so they are not lost during cleaning.

6. Ethnobotanical and carbon-14 samples will be collected from features and other possible cultural contexts. Samples will be ranked according to their context and data potential. Preferred samples should lack sources of potential contamination from burrows and nests, prolonged exposure during excavation, and proximity to modern surfaces or disturbance. First priority samples will be taken from lower strata and feature floors and interiors. Second priority

samples will come from upper feature fill or proveniences that exhibit limited evidence of disturbance. If first and second priority sample proveniences are absent the third priority samples from badly disturbed or less intact contexts will be collected.

After the hearths or storage features are cross-sectioned, the sample potential will be assessed. If samples are collected they will consist of at least 1 liter of soil for flotations and 2 tbsp for pollen samples, and will be collected from the best strata. The samples will be put into plastic bags that have been kept sealed. If burned seeds or wood are encountered, up to 20 g will be collected for radiocarbon analysis. All samples will be collected with a dry, clean, trowel or tweezers and placed immediately into a bag or tin foil. Carbon samples will only be collected from first and second priority contexts, unless third priority contexts are all that are available. Archaeomagnetic samples will be collected according to processing lab standards.

Sample locations will be plotted on plan and profile drawings of features and proveniences. The sample bags will be labeled with the provenience designation, feature number, location within the feature, and stratigraphic position. The samples will also be recorded on specimen forms with labeling information, environmental data, contextual information, and any other comments that may be useful to the laboratory analyst.

7. It is highly unlikely that human remains will be encountered. However, the procedures outlined in Appendix B are offered as a guideline in the event that they are encountered. These procedures are based on OAS, Museum of New Mexico, and legally defined guidelines.

8. Upon completion of the feature and site mapping, photographing, and recording, mechanized equipment will be used to backfill the excavation areas.

Laboratory Methods

Prior to artifact analysis, all recovered materials will be cleaned, and any materials requiring conservation will be treated. Collected samples of charcoal and ethnobotanical remains will be processed and prepared for shipment to the appropriate laboratory. The specialists will be consulted for special preparations required prior to shipment. Working copies of field maps and feature drawings will be prepared and made available to the special analysts.

The lithic artifact analysis will follow the guidelines of the Office of Archaeological Studies Lithic Artifact Analysis Manual. The lithic analysis is particularly suited to monitoring technological organization. Morphological and functional attributes emphasize reduction stage, manufacture and maintenance, and tool use and discard. These are the main foci of the research orientation and implementation.

The ceramics will be identified according to existing regional typologies for the Northern Rio Grande and northeastern New Mexico. Sources of information may include Kidder and Shepard (1936); Mera (1933, 1935), and Gunnerson (1969). The primary foci of the ceramic analysis will be dating and source of manufacture. In the case of micaceous paste ceramics, paddle and anvil technology is diagnostic of Apachean manufacture. If Apachean origin is suspected, the ceramics will be studied petrographically to address manufacture technique and raw material source.

Faunal remains will be analyzed in house by Linda Mick-O'Hara. Depending of the size, condition, and preservation of the specimens they will be monitored for species, sex, age, portion, condition, evidence of butchering, and evidence of taphonomic processes. Faunal remains are important indicators of subsistence strategy and site formation. The detail of the analysis will be tempered by the abundance and condition of the faunal remains.

Upon completion of the attribute identification, the coded data will be entered into a DBase III or Statistical Package for the Social Sciences (SPSS) data entry program. Statistical manipulation of the data base will be performed using SPSS PC + Version 3. Statistical tests will be geared towards examining patterns in artifact distribution that reflect technological organization. Tests and analytical techniques that may be used include Chi-square tests for independence, cluster analysis to identify similar assemblages within LA 84318 and the El Cerrito area, and ANOVA to test for differences in artifact dimensions. Results of the tests will be illustrated with graphs, tables, charts, and distribution maps. The computerized data base may be used to generate a project artifact catalogue. Artifacts with attributes important to analysis and site interpretation will be illustrated for the report.

Laboratory analysis of collected pollen samples will be conducted by the Castetter Laboratory for Ethnobotanical Studies, Department of Biology. The flotation and macrobotanical remains will be analyzed at the Office of Archaeological Studies by the staff ethnobotanist. The analyses will identify plant resources that were used prehistorically.

Carbon-14 dating will be conducted by Beta Analytic, Inc. of Coral Gables, Florida. Archaeomagnetic analysis will be conducted by Dr. Daniel Wolfman, on staff at the Office of Archaeological Studies. The purpose of these analyses will be to obtain the most accurate range of dates possible for cultural strata and features.

Research Results

The final report will be published in the Museum of New Mexico's *Archaeology Notes* series. The report will present all important excavation, analysis, and interpretive results. Included will be photographs, maps, and tables. Raw data such as field notes, maps, photographs, and artifact catalogues will be given to the State Historic Preservation Division, Archaeological Records Management System, currently located in the Laboratory of Anthropology in Santa Fe. The artifact collection will be curated at the Museum of New Mexico's archaeological repository.

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